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Red Cross Course

in

Food Selection

THE AMERICAN RED CROSS
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CONTENTS

FOREWORD

THESE lessons have been written primarily for Red Cross classes in Food Selection, but can be used by all women who are interested in the problem of feeding the family. The course embraces a study of foods and the factors that must be considered in selecting an adequate diet. It aims to give a knowledge of foods and food groups which will enable the housekeeper to modify her selection of food to suit the needs of the individual members of the family.

The material incorporated in the course is suggestive only and must be adapted to meet the problems and needs of each individual class. Its value rests to a large extent upon the individual instructor.

Elaborate equipment is not necessary. The course has been planned to consist of lecture, class discussion and demonstration, or lecture, class discussion and laboratory work. It is desirable, if possible, to substitute home practice for laboratory work, for the more immediately the principles of Food Selection herein presented are brought into use in the individual lives and homes of the members of the classes, the more fully this course will have fulfilled its purpose.

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LESSON I

Food and Its Use in the Body

THE FUNCTIONS OF FOOD

The functions of food are:

To furnish energy to the body.
To repair worn tissues and to build up new tissues.
To regulate the various processes of the body.
To promote growth and health.

Energy Foods

Energy is furnished to the body by nearly all the food materials. These are burned or oxidized in the body giving off heat, which keeps the body warm, and providing energy for bodily activities. These activities include the involuntary work of the body involved in such functions as respiration, circulation and digestion, as well as the conscious muscular exercise through work and play. Most food materials contain more than one nutrient or foodstuff and may build tissue as well as furnish energy, but such foods as pure sugars, starches and fats may be regarded primarily as energy foods.

Tissue Building Foods

The tissues of the body are numerous and varied and each must be supplied with proper building material. Proteins, mineral matter and water supply the chief needs of the body for tissue building substances. The proteins, substances containing nitrogen, are used in building muscles, nerves, blood and even bones, and are essential constituents of every animal and plant cell. Calcium (lime), iron and phosphorus are some of the mineral substances that enter largely into the tissues and fluids of the body, and are those most likely to be deficient in the ordinary diet. Calcium is especially needed for bones, teeth and body fluids; iron for blood; phosphorus for every body tissue.

Regulatory Foods

In addition to energy foods and tissue forming foods the body requires certain substances which act as regulators—that is, they keep the body functioning smoothly. Both water and the different mineral salts act in this regulatory way.

a. Water

We do not think of water as a food substance in the same sense that protein or iron are food substances, but it is as much an essential of every cell as is protein, and is found in all living tissue. It acts as a solvent for foods and helps carry food to the tissues. It also has an important part in regulating body temperature and in carrying off waste materials from the body. Water makes up more than six-tenths of the entire weight of the body and must be supplied in necessary amounts if there is to be normal functioning.

b. Mineral Salts

We have already seen that calcium (lime), iron and phosphorus are some of the mineral substances that enter largely into the tissues and fluids of the body. These mineral matters not only build tissue, but they, with a number of others, such as sodium, magnesium and sulphur, play a very important part in regulating body processes. It is essential, then, that the food taken shall supply these minerals in sufficient amounts. Calcium is perhaps the most important of all these substances. It is necessary to the coagulation of the blood; it influences the working of the heart muscle and helps to correct any lack of balance among the other mineral elements in the body. The calcium needed from day to day can be easily supplied by the use of milk in the diet. In order to supply adequate amounts of the other mineral salts it is necessary to select a considerable variety of food materials (See Appendix, Table XIII).

c. Bulk in Foods

Many food materials are found in connection with indigestible matter such as the cellulose and fiber of vegetables and fruits and the outer layers of cereal grains. A fair amount of this indigestible material should be taken with the food in order to supply sufficient bulk to stimulate intestinal activity and prevent constipation.

Growth and Health Promoting Substances—Vitamines

Vitamines is the general name given to a group of as yet unidentified substances occurring in some natural foods and which have been found by careful experiments to be absolutely essential to the promotion of growth and the maintenance of health. The foods most notable as containing these substances are milk, fresh vegetables, particularly of the green leafy varieties, fresh fruits and whole grains. Concerning the necessity for supplying these vitamines in the diet, Dr. Katherine Blunt says: "It is more than probable, too, that all sorts of common languors and inefficiencies

and susceptibilities to many miscellaneous infections are connected with shortage in vitamines"; and Dr. Percy R. Howe of the Department of Dental Research, Harvard University, has this to say in regard to the influence of vitamines in the development and health of the teeth: "It is of course not possible to draw definite conclusions regarding human teeth from experiments, however conclusive, on the teeth of guinea pigs, but in the present state of our knowledge it would seem that those foods which are important for growth and the preservation of good health are also largely concerned in the formation and preservation of sound teeth."

The three vitamines so far studied are designated as follows: Fat-soluble A, Water-soluble B, Water-soluble C.

a. Fat-Soluble A

This vitamine is found in fresh butter fat, egg yolk, fish fat, including cod-liver oil and whale oil, the fat of animal organs such as the liver and kidney and oleo oil used in the making of oleomargarines. (Note, however, that this vitamine is not found in nut margarines made from vegetable oils.) Among the vegetable sources of fat-soluble A, spinach ranks high; cabbage and carrots not so high; while peas rank lower than either of these. Over-heating of any of these food materials seems to lessen their vitamine content.

b. Water-Soluble B—The anti-neuritic vitamine

Water-soluble B is more widely distributed in plant than in animal foods. Yeast is the richest known source of this vitamine. Most vegetables and fruits and cereals of which the whole seed (germ and bran) is used contain it. Various animal tissues—liver, heart, brain and kidney contain satisfactory amounts. Milk and lean meat are by no means rich in it. Water-soluble B appears to be little affected by ordinary cooking temperatures but there is danger of its partial or complete destruction when subjected to the higher temperatures used in canning.

c. Water-Soluble C—The anti-scorbutic vitamine

Water-soluble C is found in largest amounts in green vegetables and fresh fruits, and in less amounts in the root vegetables and tubers. Raw cabbage, tomatoes, orange and lemon juices and the extract of orange peel are rich in this vitamine. Water-soluble C is highly sensitive to heat. So far the vitamine in tomatoes has been the only one found to be practically unaffected by the temperature used in canning. Dried foods are deficient in this vitamine although dried beans develop it on sprouting. Experiments with sprouted beans have given good results in the treatment of scurvy. The Chinese have long made use of seed sprouts as food.

The home dietitian may not come in contact with the more spectacular forms of malnutrition such as beri-beri, found among the lower classes in India and in the South Sea Islands, scurvy in camps and on shipboard, pellagra in the poorer districts in the Southern States and the serious eye disease afflicting the children in the war devastated countries of Europe; but she will encounter some of the more commonplace results of malnutrition such as infantile scurvy, imperfect development of teeth and bones and habitual susceptibility to colds and other infections, and she should know what to do to correct them.

AMOUNT OF FOOD NEEDED

The diet should include some food from each of the classes of food substances which have been discussed. The supply of energy food must be sufficient to furnish heat for body warmth and energy for all the body activities. The amount of energy or fuel needed will vary with different individuals depending upon age, size and amount of work or play carried on by them.

Unit Measure of Heat

The fuel value of food is measured by the calorie.* This is the unit measure of heat just as the yard or foot is a unit measure of length or the quart a unit measure of capacity. We speak of so many calories of heat as we would of so many quarts of milk.

Protein and carbohydrate (sugars and starches) have equal caloric value. Pure fat has two and one-fourth times the caloric value of either protein or carbohydrate. In making up the total calorie requirement protein should be limited to the amount necessary to furnish adequate building material. The remaining calories needed should be obtained from carbohydrate and fat. The calories from carbohydrate should be from two to three times as many as those from fat.

The 100-Calorie Portion

For convenience we often use a 100-calorie portion as the unit for measuring the fuel value of the food at a meal. We can learn after a time to recognize the fuel value of different foods just as we have learned by experience that a quart of flour weighs about a pound, while it takes only a pint of butter or sugar to weigh the same amount. One medium sized potato or a scant tablespoonful of butter will come to represent to us 100 calories just as definitely as it represents any weight or other measure.

*Calorie is the name given to the amount of heat required to raise the temperature of one pound of water four degrees Fahrenheit, or one kilogram of water one degree Centigrade.

A 100-calorie portion often corresponds to an ordinary serving of food and it is not difficult to estimate quickly, in a rough way, the amount of food one is eating by noting the number of 100-calorie portions.

The following table gives the approximate measure and weight of 100-calorie portions of a number of common food materials.

TABLE I.

100-Calorie Portions of Certain Foods.

Name of food.	Approximate measure.	Weight in ounces.
GROUP I		
Vegetables		
Asparagus, fresh	20 large stalks, 8 inches long	15.9
Cabbage, shredded	5 cups	11.2
Celery	4 cups of ¼ inch pieces	19.1
Lettuce	2 large heads	18.5
Peas, green shelled	¾ cup	3.5
Potatoes, white	1 (medium)	5.3
Potatoes, white, mashed	½ cup (scant)	3.1
Tomatoes, fresh	2 to 3 (medium)	15.5
Fruits		
Apples, fresh	1 large	7.5
Bananas	1 large	5.5
Oranges	1 large	9.5
Peaches, fresh	3 (medium)	10.5
Strawberries, fresh	1⅓ cups	9.0
GROUP II		
Eggs	1⅓ eggs	2.7
Cheese	1⅛-inch cube	0.8
Milk	⅝ cup	5.1
Fish	Medium serving	2.4
Beef, sirloin steak, lean slice	2 by 1½ by ¾ inches	2.0
Lamb chop	1 chop	1.6
Peanuts	20 to 24 single nuts	0.6
GROUP III		
Bread	2 thin slices	1.3
Baking powder biscuit	2 small biscuits	1.3
Cornmeal, uncooked	⅛ cup	0.99
Cornmeal, cooked	⅔ cup	6.0
Macaroni, uncooked	¼ cup (1½ inch length)	0.99
Macaroni, cooked	1 cup	5.2
Oatmeal, uncooked	⅛ cup (scant)	0.88
Oatmeal, cooked	1 cup	7.9
Rice, uncooked	⅛ cup (scant)	1.01
Rice, cooked	¾ cup	4.0
GROUP IV		
Sugar, granulated	2 tbsp. (scant)	0.9
Sugar, loaf	3½ lumps	0.9
Molasses	1½ tbsp	1.2
GROUP V		
Butter	1 tbsp. (scant)	0.5
Cream, thin (18% fat)	¼ cup	1.8
Cream, thick (40% fat)	1⅓ tbsp	0.9
Oleomargarine	1 tbsp	0.5
Olive Oil	1 tbsp	0.4

SUGGESTIONS FOR DISCUSSION

Explain the difference between food value and fuel value, pointing out that some foods with a low fuel value are exceedingly important in the diet.

If possible weigh or measure out 100-calorie portions of as many foods as convenient, especially of those used every day. It is of little importance for the ordinary housekeeper to know the origin of the calorie, or to be able to calculate a dietary with exactness, but it is of great importance for her to be able to estimate quickly the approximate value in calories of the food used or served.

HOME WORK

Have each member of the class keep a record of the kinds of food used by her during some one day before the next lesson. The Food Record blank prepared by the American Red Cross is for this purpose. Suggest that she also keep a record in the same way of the food used every day between the first and twelfth lessons.

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How to Select Foods—Part I. What the Body Needs, Farmers' Bulletin 808.

For sale by Superintendent of Documents, Government Printing Office, Washington, D. C.

Principles of Nutrition and Nutritive Value of Food, Farmers' Bulletin 142. Price 5 cents.

The Chemical Composition of American Food Materials, Office Experiment Station Bulletin 28. Price 10 cents.

LESSON II

Planning the Day's Food

FOOD GROUPS

The foods that we use may be grouped as follows:

Group I. Vegetables and Fruits

Vegetables and fruits are most valuable sources of mineral salts, organic acids and vitamines. All these substances are essential to the regulation of the body processes and to the promotion of growth and health. The use of green vegetables and fruits helps to make good a shortage of milk and milk fat in the diet. The cellulose found in foods of this group gives desirable bulk.

Group II. Foods Containing Large Percentage of Protein

Milk, eggs, cheese, medium fat meats, fish, oysters, dried legumes, nuts and similar foods.

This group is known as the tissue building group. It is made up of food materials having high percentages of protein. Of this group the proteins of milk, eggs, meat and fish are in most available forms—that is, they are the most easily digested and assimilated in the body. Milk and eggs contain also important minerals and vitamines.

Group III. Foods Rich in Starch

Wheat, rice, macaroni, tapioca, crackers, potatoes, corn, oats, rye, other cereals and cereal products such as bread.

These foods are characterized by their large starch content, which makes them valuable as sources of energy. At the same time, with a few exceptions, they contain sufficient protein and mineral salts to make them valuable as tissue builders. Unless very highly milled they give considerable bulk to the diet.

Group IV. Sugars and Other Sweet Foods

Sugar, honey, jams, jellies, preserves, dried fruits and other foods which consist chiefly of sugar.

The foods of this group, being made up largely of sugar, supply little else besides energy. Jams, jellies, preserves, dried fruits and molasses con-

tain some mineral salts. It would be quite possible to secure enough energy without using the foods in this group, although they are highly valued for flavor.

Group V. Fats and Fatty Foods

Butter, cream, oils and fats, such as lard, bacon and other foods consisting chiefly of fat.

Fat affords more than two times the energy of either protein or carbohydrate. The foods of this group, however, cannot be characterized as furnishing only energy, for butter, cream, fish fat and fat from certain animal organs are sources of fat-soluble A. Bacon yields also some protein.

Foods From Each Group for Every Day

Since each of the above groups serves a definite purpose in the body, the dietary of every day should contain some foods from each group. It should be so proportioned that food from each group will be supplied in sufficient amounts. The food chosen from the fourth group, the sugar group, may be relatively less in amount than the others, as sugar is present in fruits, milk, cereals and some vegetables. The sugar group is, of course, important in making the diet palatable, but a large amount of sweet food is satiating and dulls the appetite for other needed foods. The factors which determine the amount of food to be chosen from each group will be considered in later lessons. If the food-group idea is used in meal planning, one will readily become "familiar with the classification of all of the foods; the foods which make up the groups; their place in the food program and their importance in the diet." It will be found a saving in both time and money if all three meals are carefully planned ahead for each day of the week. There will be some emergency changes, but, as the plan is continued, fewer will occur, and the housekeeper will find that her meals will become more and more satisfactory from every standpoint. Of course, the program of meals should be varied from week to week.

WHY A KNOWLEDGE OF FOOD VALUES IS ESSENTIAL

In planning meals the food requirements of the individual members of the family must be known. A diet that is adequate for the men of the family, who may be doing heavy muscular work, will need some modifications for the members who are performing less strenuous work, or who perhaps have certain idiosyncrasies which must be recognized. The food requirements of younger members of the family must likewise be considered. To meet these different needs satisfactorily the housekeeper must

have such knowledge of ordinary food materials as will enable her to provide the proper foods without too great expenditure of either time or money.

WELL-PLANNED MEALS NOT NECESSARILY EXPENSIVE

Intelligence is needed for the planning of attractive and adequate meals. Each of the food groups includes both expensive and cheap foods. The expensive foods are usually selected on account of their flavor, texture, color or perhaps even scarcity. Within certain limits any food in a given group may be substituted for another in the same group. In making up a low cost diet a large amount of food from the cereal group should be included, since the cereals contain fairly adequate amounts of protein and mineral salts as well as starch. This diet may easily become bland and tasteless unless carefully supplemented with foods furnishing flavor. However, flavor foods, when expensive, need only be used in amounts sufficient to make the meals more palatable.

In a moderately expensive diet for the adult the distribution might be somewhat as follows for every 1,000 calories used:

Group I. About 200 calories.
Group II. About 200 calories.
Group III. About 300 calories.
Group IV. About 100 calories.
Group V. About 200 calories.

In a less expensive diet half of the calories might be furnished from Group III. Only a very general guide can be given as different combinations may be made, and under certain conditions food in one group may be safely substituted for those in other groups.

VARIETY IS IMPORTANT

Variety is important in making meals attractive. Too many strongly flavored foods are as objectionable as too many bland ones. The same flavor should not be used twice in the same meal, as tomato soup and tomato salad. Variety in texture is almost as important as variety in flavor. The contrast in texture explains the reason for serving crackers or croutons with soup and wafers or cake with ice cream. Too many liquid or semi-liquid foods at the same meal, or too many dry ones are not pleasing. Good color combinations add attractiveness to a meal. Even more important than color contrast is the service. The orderly placing of china and silver on the table as well as of food in dishes suitable in size

and shape adds materially to the general attractiveness of a meal, and stimulates the appetite for the enjoyment of even the plainer foods.

SUGGESTIONS FOR DISCUSSION

Ask each member of the class to list foods used during the day previous to the day of the lesson and to arrange them in their respective food groups. Make an extra list to include food accessories, such as coffee, tea, flavoring, vinegar and leavening agents. Have the class point out in each dish of a typical meal all the groups represented. As an example, in lettuce and tomato salad with boiled dressing, the following groups are represented: lettuce and tomato, Group I; milk, Group II; fat, Group V; sugar, Group IV; flour, Group III. Mustard, vinegar, etc., are listed as food accessories.

Give examples of meals that contain too much fat, too much protein, too much starch and sugar and discuss fully why each is undesirable. Plan meals for a week emphasizing the importance of such a plan.

Show how food prepared in a certain way one day may be used the following day in an altogether different way—thus economizing time.

Make lists of foods in each group under the heading: Least Expensive; Moderately Expensive; Most Expensive. Tell why certain combinations are pleasing and others unpleasing. Discuss planning meals for attractiveness.

HOME WORK

Estimate the number of 100-calorie portions in the day's food already discussed and how they are distributed among the different food groups.

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How to Select Foods—Part I. What the Body Needs, Farmers' Bulletin 808.

LESSON III

Vegetables and Fruits

THE NEED OF VEGETABLES AND FRUITS

Vegetables and fruits are not luxuries but necessities. They are not so cheap as cereals and sugar when considered as sources of energy but they furnish certain substances needed by the body which are not given by these other foods or not given in sufficient quantity. All vegetables and fruits contain valuable mineral matter needed by the body to keep the blood in proper condition, to build bone and tissues (a continuous process) and even to make the heart beat. Iron, calcium (lime) and phosphorus, the minerals most likely to be lacking in the diet, are supplied by these foods. Fresh vegetables and fruits also furnish one or the other, or both, of the water-soluble vitamines, and since both vitamines are necessary for health, these foods have an important place in the diet. Leafy vegetables, such as greens, lettuce, spinach and cabbage, supply also the fat-soluble vitamine which is necessary for growth and health. The bulkiness of vegetables and fruits as well as the acids in them make them laxative foods. They are valuable, moreover, because even in limited amounts they add variety and flavor to the diet.

As a Source of Calcium

Practically all the foods in this group (as well as milk and eggs and the outer layers of the grains) contain calcium. Parsnips, turnips, celery, cauliflower, lettuce and carrots are rich in it; but in spite of this fact even a liberal amount of these vegetables will supply only part of the calcium needed. The rest must come largely from milk.

As a Source of Iron

Green vegetables, such as spinach, greens, cabbage, peas and beans, and the dried fruits such as dates, figs, prunes and raisins furnish iron (as do eggs, meat and the outer layers of the grains). The iron in vegetables is probably more thoroughly utilized than that in beef.

As a Source of Phosphorus

Vegetables, especially peas and beans (as well as milk, eggs, meat, fish, nuts and the outer coats of grain), contain phosphorus.

Assuming that the average individual does not consume more than

twenty-five servings of food each day, any food that contains less than 1/25 of the total day's requirement of calcium, phosphorus, or iron cannot be considered an adequate source of any one of these minerals. Any food containing less than 1/200 of the requirement has been tabulated as containing only a trace and need not be included in any calculation of mineral matter.

TABLE II.

*The Relative Value of Some Common Foods in Supplying Calcium, Iron and Phosphorus.**

Name of food.	Amount of one serving.	Approximate proportion of the day's requirement of each mineral furnished by one serving.		
		Calcium.	Phosphorus.	Iron.
Protein Foods				
Beef, round steak	¼ lb	1/50	1/5	1/4
Fish, white fish	4½ oz. (6¼ oz. as bought)	1/20	1/4	1/10
Egg	1 egg (1¾ oz. without shell)	1/20	1/20	1/10
Egg yolk	1 yolk (¾ oz.)	1/30	1/20	1/10
Milk	1 glass (¾ measuring cup)	1/3	1/8	1/40
Cheese	1 inch cube	1/3	1/10	1/50
Carbohydrate Foods				
Bread, white	1 large slice (1½ oz.)	1/50	1/40	1/40
Bread, whole wheat	1 medium slice	1/30	1/20	1/20
Bread, Graham	1 medium slice	1/30	1/16	1/15
Jelly	1 tablespoon	trace	trace	trace
Rice	2 tablespoons (uncooked)	trace	1/50	1/50
Rolled oats	3 tablespoons (uncooked)	1/50	1/20	1/30
Shredded wheat	1 biscuit	1/50	1/20	1/10
Vegetables				
Beans, navy	⅛ cup raw (½ cup cooked)	1/9	1/6	1/4
Beans, Lima	2 tablespoons dried (1 oz.)	1/30	1/14	1/7
Beans, string	½ cup (2½ oz.)	1/20	1/40	1/20
Beets, canned	4 small beets (3½ oz. cooked)	1/20	1/40	1/25
Cabbage	1 serving (2¾ oz. raw)	1/20	1/60	1/20
Carrots	½ medium sized (2½ oz.)	1/20	1/40	1/35
Lettuce	5 medium sized leaves	1/50	1/100	1/70
Onions	1 medium sized (3¼ oz.)	1/20	1/35	1/30
Potatoes	1 medium sized (5 oz.)	1/40	1/20	1/8
Spinach	1 serving (4 oz. cooked)	1/8	1/20	1/3
Fruits				
Apples	1 medium sized (5 oz.)	1/70	1/90	1/40
Bananas	1 small (2½ oz.)	1/100	1/70	1/40
Dates	6 large (1½ oz.)	1/25	1/60	1/10
Figs	3 (1¼ oz.)	1/10	1/35	1/15
Oranges	1 medium sized (4½ oz.)	1/10	1/50	1/60
Prunes	6 medium sized (1¼ oz. dried)	1/40	1/40	1/15
Raisins	2 tablespoons (¾ oz.)	1/50	1/50	1/35
Nuts				
Almonds	15 nuts (½ oz. shells)	1/20	1/20	1/25
Peanuts	½ cup unshelled (⅛ cup shelled 1 oz.).	1/30	1/10	1/25
Walnuts, English	6 nuts (¾ oz.)	1/35	1/20	1/35

*For actual weight of the minerals, see Table XIII, in Appendix, page 89.
Daily calcium requirement 0.67 grams.
Daily phosphorus requirement 1.44 grams.
Daily iron requirement 0.015 grams.

As a Source of Protein

Most fruits and vegetables supply only small amounts of protein, but peas, cowpeas, Lima, navy, kidney and especially soy beans and other legumes, such as lentils and peanuts, contain considerable amounts; dried beans as much as 1/5 of their weight, fresh beans 1/14 of their weight.

As a Source of Starch and Sugar

Some vegetables and fruits furnish considerable starch and sugar. Although the greater part of the carbohydrate in our diet usually comes from cereals and sweets, a classification of the vegetables and fruits according to their carbohydrate content, which indicates roughly the relative fuel value of the foods, will enable the housewife to compare the different fruits and vegetables as sources of energy. This classification will also prove useful when it is desirable to limit the amount of starch and sugar eaten.

TABLE III.

Vegetables and Fruits Arranged According to Their Appr oximate Carbohydrate Content.

5 per cent carbohydrate.	10 per cent carbohydrate.	15 per cent carbohydrate	20 per cent carbohydrate.
Vegetables	*Vegetables*	*Vegetables*	*Vegetables*
Lettuce	Onions	Green peas	Potatoes
Spinach	Squash	Artichokes	Shell beans
Sauerkraut	Turnip	Parsnips	Baked beans
Celery	Carrots	Canned Lima beans	Green corn
Asparagus	Okra		Boiled rice
Cucumbers	Beets	*Fruits*	Boiled macaroni
Brussels sprouts		Apples	
Sorrel	*Fruits*	Pears	*Fruits*
Endive	Lemons	Apricots	Plums
Dandelions	Oranges	Blueberries	Bananas
Swiss chard	Cranberries	Cherries	
Sea kale	Strawberries	Currants	
Cauliflower	Blackberries	Raspberries	
Tomatoes	Gooseberries	Huckleberries	
Rhubarb	Peaches		
Egg plant	Pineapples		
Leeks	Watermelons		
Beet greens			
Water cress			
Cabbage			
Radishes			
Pumpkin			
Kohl-rabi			
Vegetable marrow			
Fruits			
Grapefruit			

As a Source of Fat

As a class, fruits and vegetables are notably lacking in fat. However, olives, alligator pears and some of the legumes are exceptions to this.

As a Source of Vitamines

Since vitamines are essential to health and growth care must be taken to see that they are supplied in the food in adequate amounts. One of the main sources of these substances is fruits and vegetables. Leafy vegetables are one of the most important sources of fat-soluble A. Practically all vegetables and fruits supply water-soluble B. Since water-soluble C, the anti-scorbutic vitamine, is easily destroyed by heating or drying, it is necessary to rely largely upon fresh raw fruits and vegetables to furnish this vitamine. The effect that the different methods of drying and canning vegetables and fruits has on their vitamine content is now under investigation. It is possible that the long, slow cooking of vegetables in the fireless cooker is not to be recommended when these vegetables are the chief source of the water-soluble vitamines in the diet. Canned and dried tomatoes, however, seem to be exceptions and remain valuable sources of it.

CONSERVATION OF MINERAL SALTS

It is necessary to emphasize the importance of using the water in which vegetables have been cooked, including that around canned vegetables. Many of the mineral salts from the vegetables are found dissolved in the water. In the case of finely divided vegetables or greens which expose large surfaces to the water, as much as 1/3 to 1/2 of the mineral salts may be found in the water in which they are cooked. This water may be used in making white sauce for the vegetables, replacing part of the milk or it may be added to soups.

VEGETABLE AND FRUIT ALLOWANCE

At least a pound and a quarter of fresh vegetables and fruits should be provided daily in the food supply for each individual. As much as four pounds may be safely used in a day. Since dried fruits and dried vegetables weigh on the average about one-sixth as much as they weighed before drying, their dried weight should be multiplied by 6 in order to obtain their fresh weight. Canned vegetables should be figured at their actual weight. For example: the total fresh weight of 4 oz. potatoes, 2 oz. dates and 8 oz. of canned peas is 4 oz.+12 oz. (2 oz.$\times$ 6)+8 oz.= 24 oz.

SUGGESTIONS FOR DISCUSSION

Make a list of the common vegetables. Point out that many of them are about nine-tenths water. Such vegetables are: asparagus, beets, cabbage, carrots, cauliflower, celery, cucumbers, egg plant, greens, rhubarb, leeks, lettuce, okra, onions, pumpkin, radishes, rutabaga, squash, string beans, tomatoes and turnips. Those of about three-fourths water are: corn, parsnips, green peas and potatoes.

List the processes of cooking vegetables in the order in which their nutritive value is retained.

Discuss ways of cooking which prevent or lessen the loss of the mineral salts and ways of using the water in which vegetables are cooked.

Emphasize the fact that as the quantity of vegetables and fruits in the diet approaches the minimum, it becomes increasingly imperative that no waste occurs in the preparation or cooking. Explain that even when exceeding care is observed in paring potatoes about 1/8 of the potato is discarded, whereas the real outer coat is only about 1/30 of the whole.

The constant use of any particular fruit or vegetable makes it necessary that variety be gained through preparation. Suggest ways of utilizing the left-over vegetables.

Consider methods of preserving fruits and vegetables, and the circumstances under which each method is desirable. Difficulties in canning vegetables and the kinds that have been successfully canned may be talked over; also to what extent home canning pays.

Point out the difference in price of some fruits and vegetables which have practically the same mineral, vitamine and fuel value, emphasizing the seasonal variation in price.

Planting vegetables to get good variety and the proper storing of vegetables and fruits should be emphasized in some places.

HOME WORK

The tendency of the housekeeper is to get into a rut in meal planning and to forget many dishes that might well be used. Have the class make out lists of vegetable soups, of various ways of preparing common vegetables, of vegetable and fruit salads, and of fruit desserts that would be appropriate for use and suggest that these lists be kept where they may be easily consulted. Each member of the class might before the next lesson cook some vegetable with which she is unfamiliar or prepare an old one in some new way and report results. The class should also reckon the weight of the fruits and vegetables used in the daily diet list and determine whether the amounts are sufficient.

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LESSON IV

Protein

ANIMAL AND VEGETABLE PROTEINS

Protein is the general name given to the substances which make up the greater part of the living tissue of plant and animal cells. Plants build up their own protein substance from the elements in air and water. Animals secure their protein from either plant or animal sources. Nearly all the proteins from animal sources such as milk, cheese, eggs, meat and fish are complete within themselves and can be taken up by the body and rebuilt into its own protein tissue. Such proteins are known as complete proteins. Some of the proteins from plant sources are complete, but most of them are incomplete and must be supplemented by proteins from other foods. The use of even small quantities of milk with an inadequate vegetarian diet has been found satisfactory in making good any deficiency in the vegetable proteins. Bread and milk, macaroni and cheese, and cereals and milk are familiar examples of adequate combinations of milk and vegetable proteins.

PROTEIN REQUIREMENTS

The exact amount of protein needed daily by a given person depends upon his size and age and also upon the kind of protein eaten rather than upon his muscular activity. In general, for the adult about 10 per cent of the total calories should be derived from protein food.

Probably from one-third to one-half of the protein needed for children should come from milk, cheese, eggs and meat—especially from milk. If a young child has a pint and a half of milk a day, and, if he is eating a variety of foods, the three-quarters of an ounce of protein supplied by the milk makes unnecessary any other consideration of his protein allowance.

ORDINARY DIET OFTEN TOO HIGH IN PROTEIN

The ordinary mixed diet seldom runs low in protein, unless considerable starch and sugar are included. More often the amounts of protein furnished are too large. An oversupply of protein means not only the exclusion of other kinds of food necessary for health, but possibly actual harm to the body. It also adds unnecessarily to the cost of the food. There are a number of ways of determining roughly whether the diet con-

tains the proper proportion of protein. One way is to note the amounts of the common foods needed to supply one-fourth ounce of protein as shown in Table IV and see whether the food consumed daily contains the equivalent of about ten such portions.

TABLE IV.

Measure and Weight of Foods that Supply One-fourth Ounce Protein.

Name of food	Approximate measure	Weight
Almonds, shelled	¼ cup	1 oz.
Apples	16 (medium)	5 lbs.
Bananas	5 (medium	1¾ lbs.
Beans, dried, raw	⅛ cup	1⅓ oz.
Beans, baked	½ cup	
Beans, fresh, Lima	⅜ cup	3½ oz.
Beans, string	3 cups (cut small)	11 oz.
Beef dried		1 oz.
Bread, baker's	¼ small loaf (12 oz.) or 3 medium slices, 3½ by 3½ by ½ inches.	3 oz.
Bread, homemade	3 thin slices	3 oz.
Cheese, whole milk	1 ⅛ cubic inches	1 oz.
Corn flakes	5½ cups	4½ oz.
Cornmeal, uncooked	½ cup	2½ oz.
Cottage cheese	⅛ cup	1⅓ oz.
Egg	1 egg	
Fish, dried		1 oz.
Fish, fresh		2 oz.
Macaroni, uncooked	½ cup	2 oz.
Medium fat meat	1 piece, 1 by 2 by ¾ inches or 2 by 3 by ¾ inches.	1½ oz. to 2 oz.
Milk, whole, skim, or buttermilk	1 glass	½ lb.
Oatmeal, raw	½ cup	2½ oz.
Peanuts	30 to 35 single nuts	1 oz.
Peas, dried	⅛ cup	1 oz.
Peas, fresh, shelled	¾ cup	3½ oz.
Peas, soup thick	½ cup (equivalent of 1 oz. dried split peas).	
Potatoes, white	2½ (medium)	14 oz.

SUGGESTIONS FOR DISCUSSION

It would be interesting to measure out the amount of some of the typical foods required to furnish one-fourth ounce of protein and calculate their cost, pointing out their relative economy as sources of protein. The class might select the equivalent of ten such protein portions and distribute them among the three meals of the day, noticing what food groups are represented.

HOME WORK

Estimate from the table of quarter-ounce protein portions how much protein is contained in any day's ration already recorded on the Food Rec-

ord blank and compare this with the standard given. Members of the class will be interested in comparing the cost of protein in the different rations, and in noting the comparative cheapness of milk and cheese as sources of protein.

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LESSON V

Milk the Indispensable Food

THE MOST ESSENTIAL SINGLE FOOD

Milk is the most essential single food because no other one food so nearly meets all the body's food requirements. The protein in milk is adequate and easily digested; the fat is of especial value not only because it is quickly digested, but also because of the vitamine present; the mineral matter is abundant. Milk is the cheapest and most economical source of calcium; it contains considerable amounts of phosphorus; it is inadequate in iron only, yet even the small amount of this food element present is in a thoroughly available form.

Composition

The average composition of milk is 87 per cent water, 3.3 per cent protein, 4 per cent fat, 5 per cent sugar, and .7 per cent ash or mineral matter.

An Economical Food

Milk, considered merely as a source of energy, is not so cheap a food as the cereals, sugar or many forms of fat; but it is an economical food because of the quality and quantity of food elements supplied for a given sum of money. No other one food contains so many of the elements needed by both children and adults. Diets that are deficient in milk are generally lacking in calcium. The ordinary diet is more likely to be wanting in calcium than in any other mineral element. In a study made in New York City, it was found that whenever a family used less than an average of one-third of a quart of milk a day per person the diet was always deficient in calcium. One glass of milk, or one and one-third ounces of cheese will give the same amount of calcium as eight and one-half eggs, three oranges, five figs, forty-five dates, one and one-fourth pounds of cabbage, five and one-half pounds of potatoes, or eight and one-half pounds of meat. One glass of milk will furnish one-third the calcium needed by the adult each day. Even at present prices milk is generally a cheaper source of protein and energy than meat or eggs. Two-thirds of a glass of milk gives 100 calories; one pint is the equal in energy value of four eggs, or one-half pound of lean meat. One glass of milk (one-half pint) is a one-fourth ounce of protein portion. It is a mistake

to go without milk, however small the amount of money to be spent for food. Every child over two should drink at least one and one-half pints of milk a day, and every adult one-third of a quart. Yet milk as the only food would not be a satisfactory diet for the child after the weaning period or for the adult; it is so dilute that he would have to use too much of it to supply the needed energy. Then too, milk is so completely digested that it does not give the necessary roughage, nor does it provide enough water-soluble B and C, and it needs supplementing by iron-containing foods such as whole grain products, vegetables, fruits and eggs.

THE CARE OF MILK

Milk is one of the most perishable foods and needs careful handling to keep it safe. We sometimes forget that harmful bacteria, even actual disease germs, may find their way into milk from contaminated water, from dirty utensils and from unclean hands. Some of the worst outbreaks of typhoid fever, diptheria and scarlet fever have been traced to milk which had been carelessly handled. Many cities, to lessen the danger from carelessness, require that all milk sold, except that from certified dairies, be pasteurized. Milk should be kept cold as the following table will emphasize:

*Rapidity With Which Bacteria Multiply in Milk at Different Temperatures.**

Temperature Fahrenheit	Number per 10 cubic centimeters in beginning	Number at end of 6 hours	Number at end of 12 hours	Number at end of 24 hours	Number at end of 40 hours
50°	10	12	15	41	62
68°	10	17	242	61,280	3,574,990

BOILED MILK

The boiling of milk changes its physical and chemical characteristics to some extent and decreases the amount of the anti-scorbutic vitamine present. Boiled milk is somewhat more easily digested than uncooked milk because it forms a softer and more flocculent curd in the stomach. The boiling of milk also destroys any ordinary disease germs that may have found access to it.

SOUR MILK

In the souring of milk, part of the milk sugar is changed into lactic acid by the action of lactic acid bacteria. Souring does not take place quickly

*Farmers' Bulletin No. 490. Bacteria in Milk, L. A. Rogers.

if the milk is clean and kept at a low temperature. Neither does souring affect the wholesomeness of the milk. However other bacetria, especially those that act upon the protein, may generate dangerous substances in milk.

MILK PRODUCTS

Less than half of the milk produced is used directly as fresh milk. About 40 per cent of it is made into butter and 5 per cent into cheese. Much is used in the manufacture of ice cream, condensed and evaporated milk, and milk powder. The most important milk products are butter, containing chiefly the fats of milk; cheese, the pressed and ripened curd containing the protein called casein, the fat and most of the mineral salts. "Condensed" milk is milk which has been evaporated to about 2/5 of its original bulk, and preserved by the addition of large amounts of sugar. "Evaporated" milk is unsweetened condensed milk. The milk is evaporated to about 1/2 or 2/5 of its original bulk, put into cans, and sterilized. If properly prepared and sealed, it will keep indefinitely. Milk powder containing not more than 5 per cent of water is prepared by drying whole milk, skim milk, or half skim milk by various processes. Because it keeps well and can be transported readily its use should become more general. It has been in use for a long time by bakers. Milk powder made from skim milk is used in the manufacture of ice cream and milk chocolate.

WASTE OF MILK

The manufacture of condensed, evaporated and dried milk during the season of greatest production of milk, the middle of April to the middle of July, tends to prevent the waste that might otherwise occur at this time. One important problem in lessening waste is to devise ways for using the great quantities of skim milk from which the cream has been taken for use as such, or for butter making. Besides the ways suggested above, skim milk is made into cottage cheese, buttermilk, or is used for stock feed. The casein of milk is often used in the manufacture of buttons, glue or sizing, but it is regrettable that such a valuable food should be diverted to any such use. Skim milk can be satisfactorily used in all forms of cooking and should be on sale at a low price in every community.

COMPARATIVE COST OF PRODUCTION OF MILK AND BEEF

It has been estimated that of a given amount of grain fed to a cow, 18 per cent of the total energy value and 33 per cent of the protein of the grain are recovered in the milk produced, while only about 3.5 per cent would be recovered if the animal were used as beef. The amount of labor required in the production and distribution of milk is considerably greater

than for the production of beef. It follows then that the farmer must receive a fair price for his milk in order to enable him to increase the supply, and less wasteful methods of distribution should be put into operation.

CALCULATION OF THE PROTEIN ALLOWANCE

In keeping account of the daily amount of food used from the protein group divide the weight of the milk by four to make it comparable in composition with the other protein foods, and add this amount to the weight of the other foods of this group. In increasing the milk in a diet that already has enough protein, for each cup (8 ounces) of milk added, use 2 ounces less of meat, fish, eggs, or other food from the protein group.

SUGGESTIONS FOR DISCUSSION

Review the food value of milk, emphasizing its protein, calcium and vitamine content; how and when it needs to be supplemented in the diet. Enumerate ways to introduce milk into the diet other than as a beverage, for example in milk soups, milk desserts and cereals cooked in milk. A list of such dishes might well be made. Suggest the use of sour milk and buttermilk as well as skim milk in cooking. Make a special point of the need for proper standards of cleanliness in the production and distribution of milk, also for care of milk in the home. Tabulate the cost of milk, eggs, cheese, meat and cereals containing equal amounts of protein; equal fuel value. These foods might be weighed out and arranged as an exhibit.

HOME WORK

Find out what the milk regulations are in your own state, town, or city. What standard is set for the composition of the milk? What provisions are taken to safeguard its cleanliness? How well the regulations are enforced? If they are not properly enforced, what can be done by the individual to help in their enforcement? Is there any attempt toward cooperation in the distribution of milk?

Arrange for a visit to a good dairy if there is one within reasonable distance.

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Milk the Indispensable Food for Children.

LESSON VI

Meat and Meat Substitutes

MEAT

Structure of Meat

In general it may be said that meat consists of the lean or muscle, fat, bone and gristle or connective tissues of animals which are sources of food. The lean is made up of microscopic fibers, tubes filled with meat juice, bound together into bundles by connective tissue. These tiny bundles are bound together in still larger bundles, which fall apart when the meat is "cooked to pieces," since cooking in water dissolves the connective tissue. The fat, always present in meat, is either deposited in large layers that are easily visible, or in smaller quantities around the fibers where it cannot be seen.

Composition of Meat

Generally speaking, meat is from 1/2 to 3/4 water, and from 1/6 to 1/5 protein. The amount of fat varies from 1/10 to as much as 1/2 or more in the very fat meats. As a rule the greater the amount of fat the less the amount of water present.

The walls of the muscle fibers and the connective tissue are protein, and still other proteins are dissolved in the meat juices. Meat contains considerable iron and phosphorus, but not much calcium. It contains some vitamines. Fat-soluble A is found in some special glands and organs like sweetbreads and liver, and in some of the softer or yellow fats, especially of beef. Water-soluble B is found in limited amounts in muscle tissue, but in satisfactory amounts in heart, kidney, brain and liver. Meat, especially that which has been cooked, cannot be depended upon as a source of water-soluble C. Extractives give meat its characteristic flavor, but have almost no food value, therefore clear meat broths, which contain little except these extractives, should be used merely to stimulate appetite and digestion.

Tough and Tender Cuts

Meat cuts may be divided roughly into two classes, tough and tender. Toughness is due principally to the kind and amount of connective tissue. Freshly killed meat is less tender than ripened meat. The meat from older animals is tougher than that from young ones. The parts of the animal which have been most used in exercise are the toughest parts. The neck

and fore and hind parts of the animal are toughest and the loin or portion just back of the middle of the back bone is the most tender. These tender cuts are generally the most expensive. It should be remembered that tough cuts are just as nutritious as the most expensive tender cuts and if properly cooked can be made palatable and tender. Since tough meat is best when cooked at a low temperature, little heat is required and for this reason the amount of fuel used in the cooking need not exceed that required for the more rapid broiling of steaks.

Economy of Various Cuts

In calculating the cost per pound of the edible portion of the various cuts of meat the proportions of lean, fat and bone as well as the price per pound must be considered. On the whole the cheap cuts are the most economical sources of meat but when all steaks are sold at the same price per pound, as was true in many places during the war, round is cheaper than chuck, because it contains more edible meat.

Cooking of Meat

Just as heat hardens or coagulates other proteins, such as for example egg white, it hardens the walls of the muscle fibers in meat especially if high temperature is used. The proteins soluble in the juice are also coagulated by heat. Dry heat shrinks and hardens the connective tissue; moist heat on the other hand dissolves it and turns it into gelatine. Cooking a piece of meat at high temperature or searing it quickly coagulates the proteins on the outside and seals the meat juices within. In making soup the meat should be placed on the fire in cold water to draw out the juices and cooked at a low temperature. Grinding the meat for soup or broth facilitates the extraction of the juice. While the tender cuts of meat may be cooked quickly at a high temperature in dry heat or without water the tougher cuts must be cooked slowly in moist heat, though they may be seared with high heat in the beginning in order to develop flavor.

Economy in Use of Meat

Great economy in the use of meat may be gained by serving it less often, by using the cheaper cuts and left-over trimmings and organs, and by extending the flavor of the meat in combining it with cereals or vegetables.

MEAT SUBSTITUTES

Fish

Fish is much like meat in its structure and composition and might well be used in place of meat more frequently than it is. Our fisheries are undeveloped and are almost inexhaustible. Fish spoils easily, and so de-

mands special care in handling. It should not be kept any length of time unless canned or frozen. Frozen fish must be used quickly after thawing because such fish spoils even more rapidly than before it was frozen.

Eggs

Eggs are a valuble source of protein; they furnish fat in the form of oil in the yolk, which contains large amounts of the fat soluble vitamine. Eggs do not supply much calcium, but they are especially valuable sources of iron and phosporus. If eggs are not included in the daily ration, the iron requirement of the body is not likely to be met. In case eggs must be kept at the minimum, the supply of whole cereals, vegetables, and dried fruits and vegetables must be increased. (See Table III). While new laid eggs have a flavor not to be had from any others, eggs properly preserved do not lose any of their nutritive value.

Cheese

Cheese as a source of protein is not generally appreciated. American cheese is about 1/3 protein, 1/3 fat, 1/3 water. It contains considerable amounts of calcium and phosphorus. One pound of American cheese represents the protein and fat of a gallon of average milk. Cottage cheese is another valuable and economical meat substitute. Both cottage cheese and meat contain approximately 20 per cent of protein.

Legumes

The legumes are characterized by their high protein content. They are not only richer in protein than other vegetables, but when dry they contain a higher percentage of protein than meat does. On account of their additional high carbohydrate content in general their fuel value is greater. Meat fat enough to equal the dry legumes in energy value would be below them in protein content.

The relative cost of protein from different sources is shown in the following table. The prices shown are simply taken arbitrarily.

TABLE V.

Weight of Protein that Can be Purchased for 25 Cents.

Food material	Price per unit measure	Weight of protein
Cottage cheese	25 cents per lb	3 1/3 oz.
Skim milk	10 cents per qt	2 9/10 oz.
Whole milk cheese	50 cents per lb	2 oz.
Whole milk	15 cents per qt	1 4/5 oz.
Round steak	45 cents per lb	1 2/3 oz.
Eggs	60 cents per doz	1 1/4 oz.

RULES FOR BUYING

1. Do not buy any meat for a family of five (2 adults and 3 children) until you have bought three quarts of milk daily.
2. Spend at least as much for milk as for meat and fish.
3. Spend at least as much for vegetables and fruits as for meat and fish.
4. Meat and fish are usually the most costly part of the diet. They should not total more than 1/5 to 1/6 of the whole cost. This is difficult of accomplishment on low income levels; on moderate and high it is relatively easy.
5. Meat once a day is all that is necessary. In fact meat two or three times a week is ample.

CALCULATION OF AMOUNT OF PROTEIN NEEDED

The total weight of the food used from this group per day per individual shoud be within the limits of 6 to 14 ounces. In reckoning, count only 1/4 of the weight of whole or skim milk, or oysters and clams, and of meats containing exceptionally large amounts of bone, as these are approximately about 1/4 as concentrated as the other foods in the group. Add this amount to the actual weight of all the rest.

SUGGESTIONS FOR DISCUSSION

Show the structure of meat by scraping a small piece of raw lean beef with a dull knife until the fibers are separated from the connective tissue. Compare with a piece of well-cooked meat.

Explain how the closing of the large cattle ranges has permanently increased the price of meat. Suggest the contrast in the cost of meat in sparsely settled and in thickly settled lands, and between the meat and fish supply.

Discuss ways of utilizing meat left from the making of soup which still contains most of its original nutritive value.

Since we usually demand meat for its desirable flavor and texture, it is important to discuss the proper cooking of it. Discuss general rules for cooking tough and tender meat. Suggest the use of the fireless cooker for tough cuts. Discuss ways of extending the flavor, as in meat pies and stews with cereals and vegetables. Discuss meat substitute dishes.

HOME WORK

The class may visit a market and see from a demonstration of the cutting up of a side of beef what the various cuts are, or they may have a lesson from the butcher on the selection of meat. They may also look up the regulations that govern the inspection of meat for their market. Let each

member of the class report the actual cost of the edible portion of a given kind or cut of meat by weighing the meat after discarding bone and waste. In some communities, the cost of home cooked versus the cost of delicatessen meats may be calculated. The comparison should take into account the cost of cooking the meat at home, the amount of waste and the loss in weight due to cooking. Successful meat substitute dishes, or ways of extending flavors may be reported.

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LESSON VII

Cereals, the Best Return for the Money

ADVANTAGES OF CEREALS

In this country cereals make up about one-third of the diet, but in some countries, such as France, cereals form more than half the diet. Cereals are often spoken of as carbohydrate foods, the carbohydrates being mainly starch, sugar and cellulose. Yet while cereals do furnish both starch and cellulose they should not be considered simply as starchy foods for they also supply considerable protein. They contain on the average about 12 per cent protein, 1 per cent fat, and 75 per cent carbohydrate. An average made from 400 studies has shown that in this country we get from cereal food about 43 per cent of the protein we eat. Cereals are used abundantly because they are an economical food. As a general rule the greater the part played in the diet by cereals the cheaper the diet. They are easily cultivated and some one of the cereals will grow in almost any climate, and some will adapt themselves to widely varying conditions. Moreover, they do not spoil easily because they contain so little water, and this characteristic makes them compact for transportation. Corn is to some extent an exception, since the fat in it tends to decompose on long holding.

THE VALUE OF THE WHOLE GRAIN

The grain kernels are made up of three main parts. The embryo or the germ of the future plant; the endosperm, or main storage house of food for the future plant and the outside bran layers which cover and protect the rest. The mineral salts are found principally in the outer layers of the grain, the fat is mostly in the germ and the starch in the endosperm. Vitamines are found in the outer layers but more abundantly in the germ.

In making most flours and many breakfast foods, the germ which contains most of the fat is taken out because the fat tends to spoil more quickly than the rest of the grain. The bran layers are also discarded in the making of white flour. This leaves much starch and some protein but little mineral matter or fat and practically no vitamines. In such breakfast foods as cracked wheat or cracked oats, however, both germ and bran are present. The bran contains much cellulose which with other constituents present makes it a laxative food. People who are necessarily spending a small amount of money on food and so cannot use fruits and

vegetables freely, are in danger of having in consequence a diet that is low in certain of the vitamines and in mineral matter. For such persons it becomes important to use the whole grains as far as possible in place of the highly milled products, though this will not wholly make up in vitamines and mineral matter for the lack of fruits and vegetables.

THE CEREALS USED FOR FOOD

The cereals most commonly used for food are barley, corn, oats, rice, rye and wheat. The different cereals when used as part of an ordinary diet may be considered as having approximately the same food value. The fat-soluble vitamine, small amounts of the water-soluble vitamines and adequate protein are supplied if whole fresh milk is taken with the cereal.

EFFECT OF COOKING ON CEREALS

When cereals are cooked, the starch granules take up water. If the temperature of the water is high enough and continued for a sufficient length of time, the starch granules break down and form a paste exactly like that seen when laundry starch is boiled in water. Cooked starch has a different flavor from raw starch and is probably somewhat more quickly digested. It is not necessary to heat it to boiling in order to cook it, but in all cases the flavor is better developed by doing so. It takes longer to cook the starch granules when they are protected by the cellulose walls, as in grains or other seeds, than when the walls have been broken and the starch more or less separated, as in flour. Without exception all cereal foods, including breads, should be thoroughly cooked in order to develop the flavor.

CALCULATION OF WEIGHT OF CEREALS IN DIET

To find the weight of cereals used in the diet, count three-fourths of the weight of bread and other bakery goods (doughnuts, plain cake, rolls) and add this amount to the actual weight of flours, cereals, breakfast foods, rice, macaroni, noodles and crackers. The weight of these foods supplied daily should total from 8 to 16 ounces.

SUGGESTIONS FOR DISCUSSION

Emphasize the importance of using the whole grains to increase the mineral and vitamine content of the diet when fruits and vegetables cannot be freely supplied.

List breakfast foods and classify them as uncooked, partly cooked, and ready to eat. Discuss the comparative cost of the three classes. Determine which are made from whole grains. Point out the difference in food value when skim milk instead of water is used in cooking cereals. Make plain

the importance of handling carefully, and not exposing to dust, dirt and flies, foods like bread that are eaten without further cooking.

Discuss the cooking of breakfast cereals, the time required, the use of a fireless cooker for this purpose and the variety of cereal dishes that may be prepared for the sick. Name some methods of using left-over cereals, dried bread, etc.

Plan a day's dietary made up of cereals, fruits, vegetables and milk.

HOME WORK

The class may report on the current prices of corn meal, macaroni, noodles and the different kinds of breakfast foods. The cost and net weight of package cereals should be noted and the price per pound calculated. These may be compared with the cost of bulk cereals. The amount of food from this group used in the recorded day's diet should be calculated and compared with the limits given.

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LESSON VIII

Bread

WHEAT

The Gluten in Wheat

Wheat is the cereal most used for bread making not because it is superior to other cereals in nutritive properties, but because it makes a light loaf and the flavor of wheat bread is more pleasing to most people. It contains gluten, a kind of protein that is both tough and elastic. When air or other gas is introduced into dough and expands, the gluten stretches and holds the gas bubbles and a light loaf is formed by the hardening of the gluten by heat. Some wheat flours contain more gluten than others, although the glutens of different wheats vary in elasticity and in toughness. In moderate climates wheat may be sown in the fall and left in the ground all winter. Wheat thus sown is called winter wheat. In colder climates it is sown in the spring and matures in the late summer. This is called spring wheat. Winter wheat is soft. It contains less gluten and the gluten is of a less elastic, less tough character. It contains more starch, and is better adapted for pastry. Bread may be made with it, but more flour must be used for a given amount of liquid. Spring wheat is hard, contains more gluten and of a tough, elastic character, less starch and is better adapted for bread making. This spring wheat flour is called strong flour and will take up a larger amount of liquid than a soft flour. Durum wheat, used largely for macaroni, has a large percentage of tough gluten. Although the above characteristics generally apply, some winter wheats are harder than some spring wheats.

Milling of Wheat

The old process of milling consisted of grinding the wheat between stones. The new, or roller process, now almost universally used, differs in detail in different mills, but consists essentially in "breaking" the cleaned grain between a series of corrugated steel rollers, then in sifting each break through bolting cloth of different sized mesh, in running through smooth rollers the middlings (that part of the endosperm which is relatively rich in protein and cannot be so finely pulverized as the more starchy part), and in making a proper mixture of the various products for the different grades of flour. About 4½ bushels of wheat are required to make one barrel of flour (196 pounds) and from one barrel of flour the baker makes an

average of 270 to 280 one-pound loaves of bread. In the household process from 2/3 to 3/4 pound of flour is used in making 1 pound of bread.

Quality of Flour

The best bread flour is somewhat granular, creamy white in appearance, and falls apart easily after pressure in the hand. Flour having a gray color or a musty smell should not be used.

Graham and Whole Wheat Flours

Graham flour properly speaking is the whole grain ground, but the commercial Graham flour is often white flour mixed with bran. "Entire wheat" or whole wheat flour contains about 85 per cent of the entire grain, and is ground finer than Graham flour.

DOUGH FROM OTHER GRAINS

No other cereals have proteins that will make as elastic a dough as will the gluten of wheat flour. Rye flour when mixed with water forms a dough more nearly like that of wheat flour than any other grain, though it is much less tough, only slightly elastic, more sticky and soft and makes a less light loaf of yeast bread. The dough from barley flour is still more sticky; that from oats, rice, or corn flour has almost no tenacity and breaks if stretched. To make yeast bread from any of these flours some wheat flour must be added.

BREADS

The term bread is used to specify the baked product of any flour or meal mixed with water or other liquid. Crackers, beaten biscuit, even the cake of meal baked on the hearth or on a hot stone are all varieties of bread. The greater part of the bread used is leavened with yeast and baked in loaves. Salt rising bread is similar to yeast bread, but is leavened by bacteria instead of yeast. The so-called quick breads are leavened with baking powder, sour milk and soda or by air and are usually baked in small cakes such as biscuits, muffins or crackers. The essential ingredients of yeast bread are flour, liquid, salt and yeast. To these may be added sugar and fat, often potato, sometimes egg and various other materials. Part of the flour may be rye, barley, corn, rice, soy bean, peanut, oatmeal or potato flour.

YEAST

Yeast is a microscopic one-celled plant which multiplies rapidly when supplied with warmth, moisture and food. In the process of its growth yeast decomposes the sugar in its food into carbon dioxide gas and alcohol. This gas-forming power of yeast is made use of in making bread. Yeast is

introduced into a batter or dough made of flour and liquid and a little sugar. The mass is kept warm in order to stimulate the growth and multiplication of the yeast. The gas formed by the yeast expands in the dough and renders it porous. The elastic gluten of the dough permits of its stretching, but at the same time it is sufficiently tough to prevent the escape of the gas. When the dough has become sufficiently permeated by the gas, usually when the mass has doubled in bulk, the loaf is baked. The heat of the oven kills the yeast plants, hardens the gluten walls of the cells and drives off the alcohol formed. For bread making yeast is best grown at a temperature of from 70° to 80° Fahrenheit. It survives low temperatures, but does not grow nor multiply in the cold. It is easily killed by heat, a temperature of 150° Fahrenheit being sufficient to destroy its vitality. Yeast plants also survive drying for a considerable time. Yeast is sold in market in either a dry or moist state. Dry yeast is prepared by mixing the yeast plants with corn meal, pressing this into cakes and drying. Moist yeast (so-called compressed yeast) is prepared by adding a little starch to a mass of actively growing yeast cells and pressing this lightly into cakes. Compressed yeast spoils readily and must be kept cold until used. Some housekeepers and bakers grow yeast in a batter from one baking to another. With care this practice works out well, but usually it is found to result in sour bread no matter how desirable the bread made of it may otherwise be.

REQUISITES OF GOOD BREAD

A well-made loaf of bread should be thoroughly baked, of nutty flavor, of even texture and grain, with well formed, evenly browned crust. Small loaves of bread are more likely to be thoroughly baked than large ones. The fineness of the grain, the thickness and character of the crust vary in different kinds of bread. The chief factors in bringing proper results are proportion of ingredients and temperature regulation.

QUICK BREADS

Baking powders in connection with milk or other liquid, soda with sour milk, buttermilk, or some other acid are used for quick breads. Baking powder is a mixture of soda and some acid substances, such as cream of tartar, or some phosphate or alum compound. It contains some starch to separate the chemicals used and prevent their reacting upon each other in the can. Soda when mixed with an acid and liquid gives off carbon dioxide gas, the same gas that is formed by the growth of yeast. Most quick breads are made in the home since the majority of them do not transport easily or stay in prime condition long.

REGULATIONS FOR THE PRODUCTION AND DISTRIBUTION OF BREAD

Since probably from 35 per cent to 40 per cent of the households in this country buy their bread, conditions should be regulated under which bread is made and distributed. These include the sanitary condition of bakeries, the health of the employes, and protection from flies and dirt in places of sale and in delivery wagons. No article of food, except milk for the child, is so important as bread. Since bread forms the staple food of a large proportion of the human race, regulations should be enforced to make it wholesome, attractive, safe and reasonable in price. In order to safeguard the health of the family, whole grain flours should be used in bread-making to supplement the supply of mineral salts and vitamines from milk, fruits and vegetables.

SUGGESTIONS FOR DISCUSSION

Outline briefly the process of manufacture of flour. Discuss the price of bread and the responsibility of the consumer toward it. Suggest that the common practice of housekeepers of putting the bread into the bread box, wrapper and all, very nearly defeats any sanitary advantage that may result from the wrapping since the accumulated dust and germs on the wrapper are introduced into the box. Discuss the flour used locally in bakeries, whether it is a hard wheat or soft wheat flour or both and explain the difference in their use. If the class is not familiar with the properties of gluten, wash some of it out of flour and show its elasticity. Bake a portion of it to show the expansion.

HOME WORK

Find out what regulation of bakeries is in force in your community. Is bread delivered without proper protection from dust and handling? Should the wrapping of bread be required? What is the proper way to care for bread? Compare the cost of home-made and baker's bread. Should the time spent in making bread be counted in the cost? If possible, visit a bakery or a flour mill and report the findings of such a visit.

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LESSON IX

Sugar and Sweets

SUGAR

Sources of Sugar

Sugar, like starch, is found in most vegetable foods. Just as starch is one of a number of ingredients in cereals, so sugar occurs in fruits and vegetables with other nutrients. Sugar is pure carbohydrate. Granulated or powdered sugar contains no protein, no fat, no mineral matter, no vitamines, no water and since it contains no water it is a very concentrated food.

Value of Sugar

Sugar is valuable as food because it is cheap, because it adds greatly to the palatability of food, and because, if eaten in moderate amounts, it is quickly and almost completely digested and absorbed. For the latter reason it is sometimes useful for supplying quick energy to the body.

Sugar Not a Necessity

It has been stated that foods from Group IV (See Lesson II) are not essential. This is true for two reasons. One is that sugar is supplied in fruits and some vegetables; the other, that all carbohydrates are changed into sugar in digestion and so supply it to the body. The agreeable flavor of sweet food often leads us to eat more than we really need, which practice is a waste of money, as well as sometimes a positive harm to the body. Also, when eaten between meals as in the form of candy it may take away the appetite for the regular meal and so prevent the eating of other foods needed by the body for growth, repair and regulation. There is danger in eating too much sugar. In a concentrated form it irritates the mucous membrane of the stomach.

Average Consumption of Sugar

In 1917 the average household consumption of sugar in the United States was a little over a pound a week per person, or about 61 pounds a year, besides the 22 pounds per capita used in the manufacture of candy, syrup, condensed milk and canned fruits. The total per capita consumption in this country ninety-four years ago was only 8.8 pounds of sugar,

though probably honey, maple sugar, syrups and molasses were used more freely then.

Different Kinds of Sugar

There are a number of different kinds of sugar on the market. Commercial granulated sugar is in all essential ways identical whether it is made from the sugar beet or the sugar cane. The sap in either case is condensed by boiling and the sugar allowed to crystallize out. The product is the refined or white sugar which may be purchased in powdered, lump, or granulated form. Brown sugar contains more or less of the molasses. Maple sugar is made from maple sap, but is left unrefined since the sap gives a desirable flavor. Glucose is another kind of sugar found in many fruits and vegetables. This is not so sweet as cane sugar. It is made commercially by heating corn starch with a little acid which is afterwards neutralized. At one time there was considerable prejudice against commercial glucose because it was not clearly understood that both starch and cane sugar form glucose during the process of digestion. Commercial corn syrup is a glucose solution sweetened with a little cane sugar. Honey is chiefly a mixture of a natural glucose sugar with another similar sugar known as fructose. Sugar of milk, lactose, may be separated from the rest of the milk. While this sugar has the same fuel value as any other sugar, it has little sweetening power.

The different varieties of molasses supply some mineral matter along with the sugars they contain. Cane molasses is a by-product from the making of cane sugar and contains varying amounts of cane sugar and fructose. Sorghum molasses and maple molasses, or syrup, are made by boiling down the respective saps. Syrup made from pure sugar contains no mineral matter. Corn syrup contains a trace of ash usually in the form of common salt.

Saccharin is an extremely sweet substance derived from coal tar. It is not a sugar and it has no food value. It is sometimes prescribed by physicians for patients who must avoid the use of sugars, but who crave a sweet flavor. It should be used sparingly, even then. The use of saccharin in commercial food manufacture is prohibited by the Federal food laws.

Calculation of Amount of Sugar in Diet

To find the amount of sugar being eaten, add to the full weight of sugar used one-half the weight of such foods as jellies, jams and preserves, and three-fourths the weight of candy, honey and syrup. If jellies, or candies are made at home, add the weight of the sugar used in them. The amount of sugar used by each person daily should not be more than 3 or 4 ounces. A pound a week for each member of the family is a fair allowance.

SUGGESTIONS FOR DISCUSSION

To illustrate the high caloric value of sugar, compare a hundred caloric portion of it with one hundred caloric portions of some other common foods. Calculate the fuel value of a glass of lemonade. Let the members of the class try chewing a cracker, being careful not to swallow until the sweet taste of the sugar produced is distinctly evident. Discuss the use of too much sugar ; also why the end of a meal is the best time to eat candy.

HOME WORK

Let the class calculate the amount of sugar used in the day's food already recorded (See Lesson I.) Let each member consider whether the 1¾ pounds allowed as the upper limit of sugar to be used in a week by one person is excessive. Have the class report ways of saving sugar which they discovered during the recent shortage and which seem of permanent value; for example, the use of less sugar in a cake to be frosted.

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LESSON X

Fats

THE VALUE OF FAT IN THE DIET

The term fat includes oils as well as the solid fats. All fats are very concentrated foods, supplying the body with two and one-fourth times as much energy as the same weight of either pure carbohydrate or pure protein. While we could probably do without any of the fats listed in Group V (See Lesson II) because meat, eggs and milk all supply fat, it is advisable to include them in the ordinary diet. We demand fat in the diet for flavor and for a certain satisfying quality which food seems to lack without it. Fat retards the passage of food from the stomach and has therefore a direct effect upon the sensation of hunger, because only when the stomach has been empty for a time does this sensation begin to be felt. This simple fact was well illustrated by a difficulty that many nations had with their diet during the recent war; there was a feeling of hunger when the food lacked fat even though the food was sufficient in amount.

SOME FOODS THAT CONTAIN THE FAT-SOLUBLE VITAMINE

So far as is known, all pure fats have the same fuel value and are about equally well digested unless they have a very high melting point in which case digestion is slower. However, they differ markedly in their fat-soluble vitamine content, some containing considerable amounts, some less and some containing none at all. Whole milk, cream, butter, the yolk of eggs and the leaf vegetables are the main sources of our supply of the fat-soluble vitamine. Oleomargarine, or butterine, made with oleo oils, especially if churned with milk, contains rather large amounts of it; but butterines made with vegetable oils appear to be lacking in it.

DECOMPOSITION POINT OF FATS

When fat is heated to a high temperature it begins to decompose and to form substances which are irritating to the digestive tract. The temperature at which this occurs varies greatly with different fats; for this reason a fat having a high decomposition point makes a better frying fat than others. To avoid decomposing the fat by high heat, as low a temperature as will give good results should be used in deep fat frying. Fat-soaked food is always unattractive. To obviate this condition food should be fried in fat that is hot enough to harden as quickly as possible the out-

side of the food. Uncooked food like doughnuts must be fried at a somewhat lower temperature than may be used for food already cooked, partly because it is necessary to allow time for the heat to penetrate and cook the food before the outside becomes too brown. For the adult a moderate amount of properly fried food should not be unwholesome, but for children fried food should be avoided.

CALCULATION OF FAT IN DIET

In reckoning the amount of fat used, add to the actual weight of butter, oil, suet, lard and other table or cooking fats, one-fourth of the weight of cream, of oily nuts in the shell and of ice cream; three-fourths of the weight of bacon, salt pork, fat pork sausage, oily shelled nuts and unsweetened chocolate. One and one-half to four ounces of fat may be used for each person daily.

AVERAGE FAT CONSUMPTION

In the United States, the average amount of fat used per person is said to be far higher than in most European countries. However, we probably waste much of this. The amount eaten by different persons varies widely. In a study made, those living on a very low income in New York City were found to be using on the average about two and one-third ounces of fat a day, while the Maine lumberman consumed thirteen ounces. An over-amount of fat in the diet means either over-eating or the eating of fatty foods to the exclusion of other needed food elements. Unless the individual is muscularly active, or living in a very cold climate as in the case of the Maine lumberman, the excessive use of fat in the diet is likely to cause digestive disturbances. Within certain limits fat and carbohydrates may replace each other in the diet.

SUGGESTIONS FOR DISCUSSION

Have the class make a list of table fats and their cost per pound; then a list of cooking fats and their cost per pound. Make it clear that the cheaper fats, vegetable as well as animal, have the same fuel value as the more expensive ones but that not all provide the fat-soluble vitamine. Discuss the need for butter unless whole milk or cream is used, particularly for children. With whole milk in the diet the margarines can safely be used. The necessity for supplying the fat-soluble vitamine should not be so strongly emphasied that mothers will be influenced to give their children too much butter, cream and rich milk and so cause digestive disturbances. Fat is one of the food materials that we are likely to waste. Have the class suggest ways of preventing this common waste, such as rendering fat, wash-

ing and using the butter left on individual butter plates, adjusting the servings of butter at table, mixing softer fats or oils with harder fats to make the latter more usable, and using different fats in cooking. Compare the average cost of a hundred caloric portion of fat with that of meat, sugar, and other foods.

HOME WORK

Let the class calculate the ounces of fat used in the day's ration already recorded (See Lesson I) and decide whether four ounces is an excessive allowance. Have the class report success in rendering and using meat fat during the week, or ways in which they have reduced an excessive use or prevented waste of fat.

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LESSON XI

Food Accessories and Beverages

FOOD ACCESSORIES

The list of food accessories is one that does not need consideration from the standpoint of food value, but allowance must be made for it in a food budget. It includes such materials as spices, flavoring and leavening agents and tea and coffee which are, as well, beverages. These add either to the flavor, variety or texture of the food. While a certain amount of money may legitimately be spent for them it is well to keep in mind the fact that they, with the exception of yeast, have no food value in the strict sense.

BEVERAGES

Water The Chief Beverage

Water is the chief beverage. It is impossible to live for any length of time without water, although it is possible to survive for weeks without food. Water softens the food and aids in its digestion and in carrying nourishment to all parts of the body. It also carries away waste from the body. In a sense water acts as a building material since the body is two-thirds water. It helps to regulate the heat of the body. It is not possible to state the exact amount of water needed as a beverage because the amount taken in food varies and because the amount given off from the body varies with activity and temperature. However, the average person needs at least 8 glasses or 2 quarts a day. Recent experimental work has shown that the moderate use of water at meals actually stimulates the flow of the digestive juices and is an aid to digestion. This fact should not be taken to indicate that food should be washed down with water instead of being chewed or that much ice water is not objectionable.

Tea and Coffee

Tea and coffee are stimulants, but there is apparently a difference in their effect upon individuals. They should never be given to children. For adults, the best way to test the effect (if one is an habitual user of them) is to go without them and see whether headaches, sleepiness, or languor results. If so, it is certain that one is depending upon them as stimulants. If one is not accustomed to their use, he can easily tell their effect by noticing whether drinking them causes nervousness, wakefulness, or palpitation. Undoubtedly it is better for those individuals who are much stimulated by tea and coffee to go without them. The stimulative

effect may be due to both the caffein and the volatile oils which they contain. Despite long accepted opinion, it may be true that the tannin present is not ordinarily the harmful factor. Many persons take coffee at the end of a hearty meal in the belief that it aids in the digestion of the food, but there is nothing to support this belief.

Chocolate and Cocoa

Chocolate and cocoa both come under the generally accepted definition of beverages, but they cannot be classed as such so strictly as tea and coffee for the reason that they both have considerable food value. Chocolate is about 12 per cent protein and 50 per cent fat and might be included in Group V. Cocoa has much of its fat removed in manufacture, but still contains 27 per cent fat and 20 per cent protein. A quarter of a square of bitter chocolate furnishes about 50 calories of energy, or over twice as much as is given by 2 teaspoons of cocoa. With milk and sugar added there is considerable food value in a cup of either beverage. Both chocolate and cocoa contain a stimulative ingredient, and both have diuretic effect. The use of much cocoa by young children is questionable, but small amounts may be added to the milk for flavor. On account of its high percentage of fat, chocolate should not be given to children.

SUGGESTIONS FOR DISCUSSION

Show samples of black and green tea and explain the difference in their preparation for market. Discuss the effects of caffein, volatile oils and tannin and make it clear why tea should not be boiled. Compare the result of the different methods of making coffee. Explain the effect of grinding coffee fine rather than coarse. Note that some of the coffee claiming to have the caffein extracted really contains caffein, sometimes in almost normal amounts. Discuss cereal coffees. Suggest the drinking of increased amounts of water as one way to lessen the desire for excessive amounts of tea and coffee. Compare the fuel value of a cup of tea and a cup of cocoa. Discuss the use of soft drinks sold at soda fountains, and suggest the danger of using those that contain caffein or other stimulants that may be habit-forming. Emphasize the need of absolute cleanliness in all public eating and drinking places and what this involves.

HOME WORK

Let each student keep a food record for a week or a month and note the expense of the food accessories, and what proportion of the total amount goes for tea and coffee. Have the amount spent for each group of foods reduced to per cent for comparison with the results obtained by other members of the class. Let each note how much liquid she drinks daily including the liquid taken as tea and coffee.

LESSON XII

Calculation of the Dietary*

BASIS OF CALCULATION

Many people argue that the appetite should be depended upon to determine the correct amount of food to be eaten. Any one who watches a child make himself sick over a box of candy or some food he especially relishes will know that this is not true. Even if the appetite does help to some extent in indicating how much food is needed, it does not tell what kinds of foods are necessary. So far, these lessons have given a method by which the required amount of food from each group may be roughly calculated. To adjust the diet more exactly to the individual needs of adults in a family whose work may vary greatly in amount and kind and to the children of the family of varying age and size, it is necessary to calculate the value of the different food groups in calories and compare the results with the needs of a given family. To accomplish this with perfect accuracy, it would be necessary to analyze a portion of each food eaten, to know exactly how much of each food each person eats, and just how much of each food he absorbs, to take account of the various kinds of work he does in a day and the time given to each task. This is not possible for the housekeeper and fortunately not necessary. If the number of calories supplied on the average by a given kind of food is known, if the number of calories needed on the average by adults doing hard, moderate or light muscular work is used, and if the proper allowance for children is made, the result is correct enough for all practical purposes. This information is given in the following tables.

TABLE VI.

Amounts of body fuel usually allowed.

For:	Approximate number of calories the food supply should furnish—	
	Per day	*Per week*
Average adult	3,300	23,000
Man doing hard work	3,600–4,200	25,000–30,000
Woman doing hard work	2,800–3,600	20,000–25,000
Man doing moderately hard work	3,500	24,500
Woman doing moderately hard work	2,800	20,000
Man doing light muscular work	3,200	22,000

*The material used in this lesson was supplied by Miss Caroline L. Hunt, Office of Home Economics, Department of Agriculture, Washington, D. C.

Food Allowance for a Family

In estimating the needs of an ordinary family (father, mother and children), unless both the man and the woman are doing hard muscular work, it is safe to allow about 3,300 calories per day for each. While the average man who is doing hard work needs a little more than this, the average woman doing her own housework (moderately hard work) needs less.

Each child over thirteen should have the same general allowance as an adult.

Each child between seven and thirteen, about four-fifths of the allowance of an adult.

Each child between three and seven, about half of the allowance of an adult.

Each child between one and three, about one-third of the allowance of an adult.

These statements apply to the caloric allowance and do not mean that children should eat all of the foods that the adult eats. The figures given refer to the calories furnished by the foods as purchased and are generous enough to allow for the waste which occurs in preparing the food for the table and for the fact that food is never divided in definite proportions among the different members of a family. It is intended as a general guide to the amount to be supplied.

Fuel Value of the Diet Reckoned by Food Groups

In the past the practice has been to try to calculate the calories furnished by each individual food used. This method means much labor and time in figuring. The new way suggested by the Department of Agriculture is much easier and shorter, as only the weights of the foods from each group are used. The calories are thus calculated as follows:

Group 1. Since fresh fruits and vegetables on the average furnish 250 calories per pound, multiply the weight in pounds, of the vegetables and fruits in this group, as found in Lesson IV, by 250.

Group 2. Multiply the weight in pounds, of the foods from this group (milk, eggs, meat, cheese and legumes, etc.), as found in Lesson VI, by 900.

Group 3. Multiply the weight in pounds, of the foods from this group (cereals), as found in Lesson VII, by 1600.

Group 4. Multiply the weight in pounds, of the foods from this group (sugar and sweets), as found in Lesson IX, by 1800.

Group 5. Multiply the weight in pounds, of the foods from this group (fats and fat foods), as found in Lesson X, by 3600.

The results may be compared with the following:

TABLE VII.

The Daily Food Needs of the Average Adult.

Total number of calories required, 3,300	Convenient proportions for a wholesome and palatable diet		Safe limits, provided appropriate changes in other groups are made	
Foods	Amounts	Calories	Amounts	Calories
GROUP I				
Vegetables and fruits, fresh, canned or dried	2½ lbs.	650	2 to 4 lbs.	300 to 1,000
GROUP II				
Milk	½ pint	650	½ pt. min.	350 to 800
Eggs, meat and similar foods	10 oz.	650	4 oz. to 12 oz.	300 to 800
GROUP III				
Cereal foods	10 oz.	1,000	6 oz. to 16 oz.	600 to 1,600
GROUP IV				
Sugar and sweet foods	3 oz.	350	o to 4 oz.	o to 450
GROUP V				
Fats and fat foods	3 oz.	650	o to 4 oz.	o to 900

Weekly Food Supply for Family of Five

The weekly food supply of a family composed of a man who works as hard as a carpenter, a woman doing housework and three children, the sum of whose ages totals from 20 to 24 (for example, 10, 7 and 4), or of a family of 4 adults, might be as follows:

TABLE VIII.

Weekly Food Supply for an Average Family of Five.

Total number of calories required, 84,000	Convenient proportions for a wholesome and palatable diet		Safe limits, provided appropriate changes in other groups are made	
Foods	Amounts	Calories	Amounts	Calories
GROUP I				
Vegetables and fruits, fresh, canned or dried	63 lbs.	16,000	50 to 100 lbs.	12,500 to 25,000
GROUP II				
Milk*	17½ qts.	11,500	17½ qts. min.	11,500
Eggs, meat and similar foods	10½ lbs.	9,500	7 lbs. to 14 lbs.	6,500 to 12,500
GROUP III				
Cereal foods†	16 lbs.	21,500	9½ lbs. to 25 lbs.	9,500 to 40,000
GROUP IV				
Sugar and sweet foods	5 lbs.	8,500	o to 6 lbs.	o to 11,000
GROUP V				
Butter and other fats	5 lbs.	17,000	o to 6 lbs.	7,500 to 21,000

*For a family of four average adults this variation might be used: Milk, a minimum of about 4,000 calories (7 quarts); eggs, meat, and similar foods which may include more milk if desired, about 14,500 calories.

†For a family of four adults the variation might be: Cereal foods, 23,500 calories.

In a study made by the Department of Agriculture in 1919, the cost for five weeks when four adults were fed was as follows:

TABLE IX

Cost in Cents per Hundred Calories for Four Adults.

Cost for—	Foods from—					
	Group 1	Group 2	Group 3	Group 4	Group 5	Total
1st week	4.6	5.2	0.7	0.5	1.8	12.8
2nd week	3.7	5.0	0.5	0.5	1.8	11.5
3rd week	3.0	4.0	0.8	0.8	1.4	10.0
4th week	3.0	3.9	0.6	0.6	0.9	9.0
5th week	2.6	3.3	0.6	0.6	0.8	7.9
Average	3.4	4.3	0.7	0.6	1.3	10.3

During each successive week an attempt was made to make the total cost of food less than that of the week before but in all cases proper amounts of food from each group were secured. It was shown that by selecting smaller amounts from the more expensive groups, as well as by selecting the foods that cost least in each group, the cost could be lessened.

The following rules for buying may also help to lessen expense:

1. Determine how much can be spent for each kind of food and keep within this allowance.
2. Watch for variations in price and take advantage of them.
3. Choose a reliable dealer and consult his judgment as to quality when you are in doubt.
4. Ask for definite amounts by weight or measure.
5. Check the weight or measure of all purchases.
6. Buy seasonable food.
7. Find out when it pays to buy in quantity, but do not buy more than you can use before the food deteriorates.
8. Study the comparative advantages of bulk versus package goods.
9. In buying canned or package goods remember the brand when you have found one you like. It may save some costly experiments.
10. Read the label, and find out what and how much you are buying.

SUGGESTIONS FOR DISCUSSION

Make it clear that the calculation of the dietary is necessary only occasionally, but that it is particularly desirable when the family is spending small amounts on food or when an individual is not properly nourished. Discuss the influence of age, sex, climate and work performed upon the amount and kind of food needed. Explain the group method of calculation and point out that the longer the period covered, the more accurate the result. It is better to calculate the diet for a week than for a day, and still

better to do it for a month. Show how easily the calculation may be made either in weight or in calories by taking stock of the weights of food on hand at the beginning of the period, recording the weights of all purchases made during the period and finally subtracting the weights of any food remaining at the end. Point out that in most localities even fruits and vegetables are now sold by weight and that the net weight is marked on all package goods. If a large amount of material (as for example, flour) is on hand, it will be easier to weigh out a little more than will probably be used during the period and to use from this instead of from the whole supply. Point out that no calorie allowance is made for foods in the accessory list. By putting the cost in the account, opposite the food bought and under the proper group heading, it is easy to calculate how much is being spent for the foods in each group. Discuss the daily records that have been kept by the members of the class since the first lesson.

It would also be well to discuss ordering by telephone, making a general plan before going to market, buying at cash and carry stores and other similar problems of purchasing.

HOME WORK

Let each member of the class calculate the total calories needed by her family for a given length of time and then make a study of the food actually used during that period. If a study of the cost is also made and reduced to cost per hundred calories, the comparison of the results obtained by the different members of the class will be helpful.

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LESSON XIII

Infant Feeding

(1 to 2 years of age)

The fact that feeding babies, even well babies, is not a thing that can be managed by rule of thumb, cannot be over-emphasized. It is a matter requiring constant attention and advice, and supervision by a physician should be continuous. The suggestions given in this lesson are intended as helps in carrying out his instructions; also hints are given for routine care.

BREAST FEEDING

Importance and Advantages of Breast Milk

Nursing is the natural method of feeding a baby. It is a great misfortune for an infant to be deprived of breast feeding during the first six months of his life, for there is nothing "just as good" as mother's milk. The child's start in life depends largely upon whether or not he is breast fed. Some of the minor advantages of breast milk are its convenience, its economy as compared with cow's milk, and that it is an assured clean sterile food, always ready at the right temperature. The great importance of breast milk, however, lies in the fact that it is a food exactly adapted to the baby's growth needs and digestive powers. It has superior nutritive value; it undoubtedly prevents certain diseases and affords some protection against others; it increases the resistance to infectious disease. Babies who are breast fed for at least the first six months of life have a far better chance of surviving infancy than those who are entirely bottle fed.

Production of Breast Milk

Every mother should be able to nurse her baby if she is physically sound and in good health. The health of the mother depends largely upon whether she has proper food and care during pregnancy; skilled assistance at confinement and sufficient rest during convalescence; abundant, varied diet during the nursing period with three or four regular meals in each twenty-four hours; plenty of water between meals; proper attention to the diet to prevent constipation; sufficient sleep and rest; plenty of fresh air and gradually increased exercise and recreation.

Supply of Breast Milk

The quantity of milk a healthy mother can produce depends upon adequate food, regular and frequent emptying of the breast and freedom from anxiety and fatigue. The diet must be liberal. She should take from one-third to one-half more food than she requires ordinarily under the same living conditions. The diet should also be selected so as to furnish an abundance of adequate proteins, minerals and vitamines and at the same time to be laxative in character. Foods from Group I and Group II must be abundantly represented. (See Lesson II.) Milk is the most valuable food for nursing mothers and the best milk producer. A quart of milk a day should be taken.

Nursing is the best stimulant there is for the flow of milk. Often the milk supply is scanty for the first few weeks if the baby is feeble and nurses poorly. In all such cases the milk should be expressed from the breasts and fed to the baby until the supply is established and the baby is strong enough to empty the breast completely himself. Milk is expressed by grasping the breast just back of the colored areola and carrying the milking motion toward the nipple without any rubbing of the breast tissue. The hands must be scrupulously clean.

Worry and overwork not infrequently cause the flow of milk to diminish. The energy of the mother's food is needed for the production of milk and should not be used up in too much manual work or exercise.

Technique of Nursing the Baby

The breasts should be used alternately if there is enough milk or both may be emptied at one nursing if the milk is scanty. From five to twenty minutes should be allowed for one nursing, according to the size, vigor, digestive capacity of the child and the abundance of the secretion. The breasts must be emptied at each nursing if the secretion is to be kept up. The nipple and adjacent breast tissue should be washed with boiled water or boric acid solution and sterile cotton before nursing. Between nursings the nipple should be covered with a piece of freshly ironed linen or sterile gauze. The baby's mouth should not be washed either before or after nursing.

Feeding Interval

A uniform interval between feedings must be maintained because in this way regular habits which promote the health of the baby are established. Irregularity of feeding tends to upset the digestion. Further, if the baby is fed too often, time is not allowed for the complete emptying of the stomach between meals. And the breast may not have time to fill between

nursings or it may not be emptied completely, and the flow of milk thus be not properly kept up. Infants should therefore be fed by the clock and should be waked in the day time for feeding. No well baby should be fed oftener than every three hours and many do better on a four-hour interval, even from birth. As artificial food takes longer to digest than breast milk, bottle babies do better on the four-hour interval. By the fifth month of life all babies should be on a four-hour interval.

Feeding Schedule

Three-hour interval.

Time of feeding, 6 a. m., 9 a. m., 12 noon, 3 p. m., 6 p. m., 10 p. m.

Total number of feedings—6 in 24 hours; during the first week 7 may be given.

Four-hour interval.

Time of feeding, 6 a. m., 10 a. m., 2 p. m., 6 p. m., 10 p. m.

Total number of feedings—5 in 24 hours; during the first weeks 6 may be given.

During the first two months not more than two feedings should be given between 6 p. m. and 6 a. m. After the third month not more than one night feeding should be given. This night feeding may be discontinued as soon as the infant sleeps all night without wakening. After 18 months, no healthy infant needs to be fed at night.

Amount Taken at a Nursing

The amount of milk taken at one time by a breast-fed infant varies greatly, but the total amount taken in 24 hours does not vary to any extent in well babies of the same age. The only way to determine how much milk a baby takes is to weigh him (in his clothes) before and after each of the several nursings during a given day.

TABLE X.

Average Amount of Milk Taken at a Nursing.

Age	Amount
1 to 3 days	½ ounce
1 week	1 to 2 ounces
1 month	2½ to 3½ ounces
3 months	4 to 5 ounces
6 months	6 to 7 ounces
8 months	8 ounces

Adjusting Mother's Milk

If the breast milk is abundant but the baby has difficulty at first in digesting it, one-half to 1 ounce of boiled water or cereal water may be given before each nursing; the intervals between nursings may be lengthened or the time of nursing may be shortened. Attention should also be paid to the conditions under which the mother is living, especially as regards her food and the amount of fresh air and exercise she takes.

Under some conditions the breast milk may be scanty and inadequate. If it is so at the beginning of the nursing period or after any illness of the mother, the breasts should be stimulated by emptying them at regular intervals. If the baby is too weak to nurse, the milk should be expressed and fed to him. If this method is persisted in, breast milk can usually be reëstablished in adequate quantities even after nursing has lapsed for several weeks. Modified cow's milk, suited to the age of the baby, should be fed him in addition to the breast milk until such milk is again sufficient in amount to nourish him. During the last half of the first year if the breast milk is persistently insufficient in amount to satisfy the baby, it should be supplemented each day by giving some modified cow's milk after one or more nursings. Part breast milk is better for a young baby than no breast milk. If the baby is six months old, cereals and vegetable soup should be started as will be explained later. An advantage of mixed feeding is that it makes weaning easy.

By the ninth month, or earlier if the milk begins to fail, weaning should be begun and should be established before the end of the first year. There is no advantage in breast feeding a well child after this period. The safest and easiest way to wean is to gradually replace the breast feedings, one by one, with bottle feedings until three bottles a day are taken without disturbance. After this, breast feeding should be discontinued altogether. If the baby is not accustomed to taking any artificial food, at least two weeks' time for weaning should be allowed if at all possible. If the child is near the end of his first year the milk may be given in a cup instead of the bottle, using care that the total amount of milk taken is the same by both methods.

BOTTLE FEEDING

Cow's Milk

Cow's milk is the best substitute at our disposal for mother's milk. It is essential that such milk fed to young children be clean, pure and of good quality and that it be kept chilled until used. If good raw milk or pasteurized milk cannot be obtained, milk powder is probably the best substitute at our disposal. For the purpose of rendering it more like mother's milk

and more suited to infant digestion, cow's milk is usually modified by dilution with water and by addition of sugar.

The Modification of Cow's Milk

For the average well baby, whole mixed milk is preferable to top milk, as it is easier to digest, simpler to prepare and equally capable of producing normal growth and development. A well infant needs about 1½ ounces of whole milk per pound of body weight per day. When a baby is very young, or when cow's milk is first given, it is safer to begin with not more than 1 ounce per pound of body weight. Two ounces of whole milk per pound of body weight are more than most infants can stand and more than they need if other foods are used in the diet.

Milk should first be diluted with boiled water. After the first month, well-cooked cereal water may be used instead of boiled water. During the early months this should be made by using only 1 level teaspoonful of flour (barley or wheat) to a pint of water. The amount of flour used may gradually be increased to 2 level tablespoonfuls at 6 months and 3 level tablespoonfuls at 9 months. In making cereal water the flour should be mixed with a little cold water until it is a smooth paste and then should be stirred into a pint of boiling water. The mixture should be boiled over a flame until it thickens and then cooked in a double boiler for at least an hour. Even very thin cereal water promotes the digestibility of the curd of milk. Thick cereal water considerably increases the nutritive value of the food.

Cow's milk has only about half as much sugar as mother's milk, and some sugar should be added to it for infant use, even if the milk is undiluted. Cane sugar does just as well for the average healthy baby as either milk sugar or malt sugar (dextri-maltose) and it is much less expensive. One-half to 1½ ounces by weight, or 3 to 9 level teaspoonfuls of cane sugar, is the usual amount of sugar that is added to the total daily amount of food. When milk sugar or dextri-maltose is used and measured by the teaspoon one-third more is needed, as these sugars are lighter than cane sugar. When first modifying milk in this way, sugar should be added cautiously and should be increased gradually up to the maximum, then gradually decreased as the infant approaches the end of the first year and takes nearly undiluted milk. The sugar of the milk plus the sugar added should never total more than 6 per cent of the whole amount of food.

No alkali or other substances need be added to milk modifications.

The total amount of food needed during the 24 hours should be prepared at one time and divided into the required number of feedings.

Preparation of Bottle Feedings*

All utensils, bottles and nipples should be washed in hot water and soap; they should be rinsed thoroughly in clear hot water. They should then be placed in hot water in the sterilizer and steamed five minutes. Boiled water, cereal, or gruel should be prepared in the meantime. The cap or the top and rim of the milk bottle should be wiped off before the cap or top is removed.

The milk should be scalded before using it for infants, unless the cow is under personal supervision or certified milk is obtained. If this operation is necessary it should be done at this time. (Milk is scalded by heating in an open saucepan until it purls around the edges and steams in the center; if left longer on the stove, it will break into a boil. A temperature of 167° to 185° Fahrenheit to which such milk is brought kills any ordinary bacteria likely to be present in milk.)

When the five minutes are up the utensils should be removed from the sterilizer and placed on a clean towel. The sugar should be measured in the measuring spoon, placed in the measuring glass, dissolved in hot water and emptied into the mixing pitcher; the rest of the water required by the formula added and the milk measured in the measuring glass and emptied into the mixing pitcher. The contents of the mixing pitcher should be stirred thoroughly. The amount of the food mixture for each bottle should be measured in the measuring glass and placed in the bottle. The bottles should be corked, stoppered with cotton or covered with clean papers held in place by rubber bands. The contents of the bottles should be cooled quickly by standing them in iced or running water. The bottles should be kept chilled, below 50° Fahrenheit.

Before a bottle is given to the infant the contents must be heated to luke-warm temperature. This is best accomplished by standing the bottle in a deep saucepan or can containing enough water to reach to the top of the food in the bottle. The water should be heated gradually and care should be taken not to overheat the contents of the bottle. The most convenient way to test the temperature of the food is to let a drop fall upon the front of the wrist, which is quite sensitive to heat or cold. It is well to shake the contents of the bottle a little in order to equalize the temperature of the food before making the test.

Cleaning and Care of Empty Bottles

After being emptied the bottles should be filled with cold water and the nipple placed upside down in the top. All bottles and nipples should be

*For a list of equipment needed in the preparation of bottle feedings, see Appendix, Lesson XIII.

washed in hot water and soap, rinsed and sterilized before being used for either food or water. Clean, sterile bottles and nipples may be kept in the covered sterilizer or the nipples may be kept in a clean jar.

Amount of Food

A general rule holds that, during the first five months of life, a well infant should be offered 2 ounces more of milk at a feeding than the number of months he is old. (See Table X.) After 6 months, when a mixed diet is usually begun, the amount of milk taken at feeding increases less rapidly up to 8 or 9 ounces at a feeding. The number of ounces of boiled water or cereal water, to be added to the amount of whole milk to make enough food for 24 hours, can be determined by multiplying the desired number of feedings by the amount of each feeding and by subtracting from this the number of ounces of whole milk.

Example—A well baby six months old weighing 14 pounds has a stomach capacity of at least 6 ounces. If he is fed on a four-hour interval and given only five meals in 24 hours, 7 ounces may be offered at a feeding. Allowing 1½ ounces of whole milk for each pound of body weight, 21 ounces of whole milk must be used. Since there are to be five feedings of 7 ounces each, 35 ounces of food must be prepared. Subtracting 21, or the number of ounces of milk, from 35, the total number of ounces of food, gives 14, or the number of ounces of boiled water or cereal water needed.

Feeding Formula.

Milk (whole).....21 ounces
Water.....14 ounces
Sugar.....1–1½ ounces (to be dissolved)

TABLE XI.

Approximate Energy Value and Measurement Per Ounce Weight of Foods Used in Modifying Milk.

Food	Approximate calories per ounce weight*	Level teaspoonfuls per ounce weight
Whole milk (4 per cent fat)	20	6
Top milk (7 per cent fat)†	30	6
Skim milk	15	6
Buttermilk	10	6
Whey	5	6
Milk sugar	120	9
Cane sugar	120	6
Malt sugar (dextri-maltose)	120	9
Oatmeal	115	9
Wheat flour	100	12
Barley flour	100	12

*A large calorie is the unit adopted by the physiologist to measure the fuel or energy value of our food.

†The upper half of a quart bottle of milk removed with a milk dipper gives a 7 per cent top milk.

An infant during the first year of life needs from 40 to 42 calories per pound of body weight and about 40 calories per pound of body weight the second year.

Example—In the case suggested above, 21 ounces of milk would give 21 times 20 or 420 calories. One to 1½ ounces of cane sugar or milk sugar would give 120 times 1 or 1½, which is 120, or 180 calories, respectively. Adding the milk and sugar calories, 420 plus 120 or 420 plus 180, would give 540, or 600. As the infant weighs 14 pounds, this would mean 38.5 to 43 calories per pound of body weight.

At this age, well-cooked cereal should be started, and this with fruit juice will furnish the additional calories needed in the total daily food allowance.

Increasing the Strength of the Food

A well baby's food should be increased once a week or oftener. The quantity and the strength of the food should not be increased at the same time and the increases in the individual ingredients, milk, sugar or cereal should alternate and be made very gradually. The food should not be strengthened, however, if the baby is not digesting it well. It is most important for a bottle baby to have no digestive disturbances.

SIGNS OF HEALTH

A gradual steady gain in weight is the best indication of health throughout childhood. A breast fed baby should gain from six to eight ounces a week during the first six months and two to three ounces a week during the rest of the year. An artificially fed but healthy child usually gains less. A gain of from two to four ounces a week by such a child should be considered perfectly satisfactory; but a gain of over eight ounces a week in a bottle fed baby should be considered excessive and an indication of overfeeding. The general condition of an infant should be considered; rosy color, quiet sleep, normal stool, good digestion and the usual amount of playfulness and activity are of as much importance as gain in weight.

FOOD OTHER THAN MILK DURING THE FIRST YEAR

A well, breast fed baby whose mother is receiving a generous and adequate diet, may not need any food other than mother's milk until the end of the first year. An artificially fed infant should receive other food much earlier because cow's milk is deficient in certain substances present in good breast milk. In most instances breast fed babies do much better than those which are fed cow's milk and breast feeding can be prolonged by the addition of foods other than milk to the diet during the second six months of life. The foods that may be gradually introduced into the diet the first

year of life are fruit juice, cereal, strained vegetable soup and egg. These foods supplement the minerals and vitamines of milk and promote the health and normal development of the infant.

Fruit Juice

Fruit juice should be included in the diet of every bottle fed baby after the third month and should also be given to breast fed babies by the second half of the first year. The strained juice of sweet oranges, or if oranges are not available, the juice of canned tomatoes are the best kinds of fruit juices to give an infant. The juice should be well diluted in water and should be given on an empty stomach, usually half an hour before a morning feeding. At first only one teaspoonful of orange juice is given daily, but this should be increased to one tablespoonful by six months and to one or two ounces by the end of the first year. If tomato juice is given, two to four times as much may be allowed, as it is much less acid than orange juice.

Cereals

By the fourth month cereal water should be used instead of plain water in diluting the milk of a healthy bottle fed baby. At the latest by the ninth month or at any time during the second half year, both breast fed and bottle fed babies should be given a little well-cooked cereal such as farina or cream of wheat. At first only one tablespoonful of the cereal should be given, with a little top milk poured on it, once a day at a regular feeding time, and should be followed by a nursing or bottle feeding. By the end of the first year a baby should be given two generous tablespoonfuls of cereal. After ten months half a thin slice of well-dried bread may be given to an infant once a day to begin with before a regular feeding, and then twice a day. Oven-dried bread is preferable to toast or commercial zwieback or crackers.

Vegetables

A good vegetable soup is made by using one cup each of diced turnip and carrot, one-half cup of spinach or celery, one teaspoonful of salt and water to cover. A soup bone or one-half to one cup of ground beef may be added to the vegetables. The soup should be cooked uncovered until the vegetables are soft; the vegetables should be strained out and pressed until the liquid is cloudy. From one to three ounces of this vegetable water may be given at any time during the second six months. The soup may be mixed with a few bread crumbs and fed with a spoon before a regular feeding, or the liquid may be given from a bottle, or used to dilute one

feeding of cow's milk. By the end of the first year from one to three teaspoonfuls of the vegetable pulp which has been pressed through a fine wire sieve, may be put into the daily portion of soup. Later the soup may be given as a purée.

Egg

During the last half of the first year an infant may be given a taste of coddled egg to see if he can take egg without disturbance. A few children are very sensitive to egg and can not take it in any form. If no disturbance follows a taste of egg, one-half a raw egg yolk may be beaten into a bottle feeding. By the end of the first year an entire egg yolk may be given in one bottle feeding, or may be divided between two of them, or a coddled egg may be given before a bottle feeding if preferred.

Water

Every infant should be given cool boiled water at least twice a day between feedings. This may be taken from a nursing bottle or from a spoon. If the baby is breast fed, water is preferably given from a bottle, as he is accustomed to a nipple. Many infants do not like plain water; the addition of fruit juice or a little sugar is helpful in getting them to take water.

FOOD DURING THE SECOND YEAR

If the baby has been started before the end of the first year on cereal, bread, vegetable soup and egg, the diet for the second year is simply an enlargement of this plan. The basis of the diet is still milk. Not less than one pint nor more than one quart daily should be given to the child during the second year. The transition from liquid to solid food is always a difficult one to make and the mother needs to have an intelligent idea of the different values of our ordinary foods and to appreciate the growth needs of young children. Many young children are given a diet too restricted in amount and often consisting too largely of starchy foods. It is a difficult task for some infants to learn to like vegetables and to eat the food that has been provided. Discipline in regard to food habits is necessary if a child's diet is to be adequate and his health is to be safeguarded.

MEALS DURING THE SECOND YEAR

Usually four meals a day should be given during the second year; for some children three meals are sufficient.

The early morning meal, at 6 a. m., should consist of warm modified milk (8 ounces or 6 to 8 ounces of milk with 2 ounces of barley gruel) and one-half to one slice of thin, well-dried bread. One-half or one well-beaten egg yolk may be added to the milk if egg agrees with the baby.

At 9 a. m. one to two ounces of orange juice, or four to six ounces of tomato juice, diluted with a little boiled water, should be given. One to two tablespoonfuls of scraped apple may be substituted. When fruit is included in a meal the giving of fruit juice at this time may be omitted.

Breakfast at 10 a. m. should consist of two to four tablespoonfuls of well-cooked farina, cream of wheat or strained oatmeal. Over this a little top milk should be poured. One-half to one level teaspoonful of sugar may be given with the cereal if otherwise it is difficult to make the child take cereal. Six to eight ounces of milk or four to six ounces of milk diluted with barley gruel should be given.

Dinner at 2 p. m. should consist of two to four ounces of vegetable soup with rice or vegetable purée, a thin slice of dried bread and butter and six to eight ounces of warm milk. Egg may be given with this meal instead of at the 6 a. m. meal and the milk omitted. After eighteen months four to six ounces of unstrained soup made with or without meat and a small helping of a simple dessert such as junket, blanc mange, custard or rice pudding may be added. Six to eight ounces of warm milk may be omitted if the dessert is included. Supper at 6 p. m. should include one to four tablespoonfuls of cereal with top milk; six to eight ounces of warm milk or four to six ounces of milk diluted with gruel; one-half to one thin slice of dried bread, or bread and butter. Fruit sauce may be added at any time.

SUGGESTIONS FOR DISCUSSION

The selection and proper care of milk to be used for feeding an infant should be discussed. The importance of extreme cleanliness in every step of the procedure from the milking of the cow to the preparation of the baby's bottle should be emphasized, and as well the care of the feeding-bottles and nipples. Discuss the regularity of feeding and the feeding interval.

HOME WORK

The class should familiarize themselves with the regulations governing the production and distribution of milk in the state and also in the local community.

LESSON XIV

Food for the Child

(2 to 16 years of age)

There is too great a tendency to give special attention to diet only through particular periods such as infancy or illness. Inadequate food at any period of life brings serious results, although these may not manifest themselves as immediately or so strikingly as they do following mistakes made in the feeding of an infant or sick person. When the child has passed the period of infancy and is beginning to eat a variety of foods care should be taken that he does not form faulty food habits which may become a permanent handicap in his growth and development.

CHARACTERISTICS OF DIET OF THE CHILD

Growing children show the ill effects of improper or insufficient food more readily than do adults. If the child does not have enough food and the right kind of food, he is stunted in growth, his physical and mental activities are curtailed and his health and resistance to disease are ultimately impaired. A man stands temporary restrictions in diet with less serious effect. By the third year, the healthy child should be accustomed to a varied diet, including food from all five food groups. (See Lesson II.) The periods of most rapid growth require the most careful feeding. During the three or four years at puberty, both boys and girls need an abundance of wholesome food. Apparently the daily food allowance for an active child at the period of greatest growth should be larger than for an adult.

The child needs about twice as many calories per pound of body weight as the adult. In the past children's food allowances have often been unwisely limited, from the mistaken notion that they were only little editions of grown-ups and needed a proportionately reduced diet. The minimum food allowances for the average child at various ages have been estimated by a number of observers. The most recent figures, as shown in the following table, are perhaps the best estimate that has been made.

In general, a healthy child should be given all the plain food that he wants to eat at meal time. An active child needs more food than a quiet child of the same age and may even require 50 per cent more energy-producing food. A varied diet should be provided, and no child should be allowed to eat exclusively or immoderately of one dish.

TABLE XII

*Food Requirements for Children According to Age Groups.**

	Calories per pound of body weight	Total daily calories
Child 1 to 5 years of age	45–36	950–1500
Child 5 to 9 years of age	36–34	1500–2100
Child 9 to 13 years of age	36	2200–3200
Girl 13 to 16 years of age	34–28	3300–3100
Boy 13 to 16 years of age	36–34	3400–4000
Girl 16 to 18 years of age	26–25	3000–2900
Boy 16 to 18 years of age	31–28	4000–3700
Adult woman (moderately active)	20	2650
Adult man (moderately active)	22	3250

Adequate Diet

The food of the growing child must contain an adequate supply of protein, minerals, vitamines and water to insure normal growth and development. The protein must be adequate in quantity and quality. Usually not more than 15 per cent of the total calories need be furnished from protein, if at least one-half of the protein is of animal origin—that is, milk, eggs, meat, or fish. Minerals, especially calcium and iron, must be liberally supplied. *It is most difficult to supply enough calcium for the growth needs of the child unless one pint of milk is given daily.* The iron foods useful in the diet of the child are spinach and other greens, egg yolk, whole cereals, legumes and certain fruits, such as oranges and prunes. An abundance of all three known vitamines must be included in the child's diet. Whole milk, cream or butter, green vegetables, fruits and whole grains are the foods to be depended upon for a vitamine supply. Every child should take an abundance of liquids. Milk, or a beverage made of milk, should be given at meal-time, and there should be plenty of water to drink between meals. Water should always be boiled for infants and, if there is any doubt of the purity of the water supply, for all children.

Easily Digested Food

Simple, well-cooked food is best for every one. Fried and all rich foods are not only difficult for a child to digest, but spoil his taste for plain food. No foods that necessitate careful mastication, such as nuts, should be given to a young child unless they have been finely ground.

* Adapted from Holt and Fales: "Food Requirements of Children," in *American Journal Diseases of Children*, Vol. 21, January, 1921, page 21.

Children Should Not Be Given Anything Injurious

Tea or coffee, or any drink containing alcohol, should not be given to children. Tea and coffee have no food value; they contain a substance which is injurious to children and, what is of more consequence, they are substituted in the diet for real food, especially milk, and so actually decrease the number of calories in the daily diet.

Three Regular Warm Meals

By the third year a well child needs only three meals a day if these are abundant. More food is actually eaten if the meals are not given more frequently and if no food, candy, or sweet drinks are allowed between meals. A child may be given a piece of bread and butter if he demands food between meals. An undernourished or sick child may have to be fed more frequently, since he may be unable to take enough food for his needs at the usual meal periods. Cold food is less appetizing and may be less digestible than warm food. For these reasons more food is usually eaten if part of it is warm. A hot dish for the school mid-day lunch should be considered a necessity. Irregular meals are almost as disastrous as eating between meals; both result in an impaired appetite and the taking of less food in twenty-four hours. A light supper is better for all young children than dinner at night. A mid-day dinner is necessary for children under seven years of age because a heavy night meal delays the bed hour and impairs the night's sleep.

Sufficient Time for Eating Meals

If one meal a day is regularly slighted, a child will not receive a sufficient number of calories daily. For instance, many children form the habit of taking an insufficient or inadequate breakfast. All children have to be taught to masticate. There is a general tendency to bolt the food or to wash it down with liquids. Some hard food, such as crusts, should be given daily.

Pleasant Meals

Children should not be nagged or worried at the table. When a child has no appetite, he should not be forced to eat. A child too sick to eat is, however, not fit for work or play. If lack of appetite persists, a physician should be consulted.

ESSENTIAL FOODS IN THE DIET OF THE CHILD

Milk

The diet of the average child should contain at least one pint of milk a day. To insure the best growth and development, one and one-half pints

of milk are desirable and one quart of milk is needed in the daily diet if a child has no other animal food. Judged by its value as a source of fuel, of adequate protein, of calcium, or of the fat-soluble vitamine, milk is without a peer; no other food furnishes such a combination of these essential properties. Milk is the indispensable food for children. Milk also supplements almost perfectly the deficiencies of the cereal foods which usually form the bulk of the diet of children. Fresh, pure, whole milk is best for children; but milk powder may be used if fresh milk cannot be obtained. Cheese is a milk product which is valuable for children. Cottage cheese can be taken at any age. Mild American factory cheese may be given after the eighth year.

Eggs, Fish and Meat

In feeding children it is better perhaps to have at least half the protein of animal origin. The use of fish and a little meat, or meat flavoring, after the second year undoubtedly gives a more varied and appetizing menu. Also it is often more convenient to be able to feed the youngest child small portions of food offered the older children of the family. In many places fish is cheaper than eggs, and at the present time meat is but little more expensive. A little fish or meat given daily is digested perfectly by the average child past infancy. Egg is an important item in the child's diet and usually easily digested. Most children can take one egg a day, besides the egg in custards, simple cake and other desserts. If children dislike the taste of egg, it may be disguised in egg-nog flavored with chocolate or fruit syrups, or a well-beaten egg may be added to a helping of cream soup just before serving. The value of fish as a food is becoming more widely appreciated. White-meated fish is more easily digested than dark-meated or "fatty" fish. The latter is, however, rich in oil which contains considerable quantities of the fat-soluble vitamine. As a source of minerals, fish has a distinct value. Properly cooked, fresh fish is easily digested by young children, and can be added in small amounts to the diet at any time after the second year. Raw or stewed oysters but not other shell fish are easily digested and can be given to young children. Dried, smoked, or pickled fish is not suitable for children. Canned fish should not be used for children under seven years of age.

Children over two years may be given small amounts of beef, mutton, lamb, chicken, turkey, or bacon. A well child over seven years may have small helpings (one to three ounces) of any well-cooked tender meat, including veal, pork, all poultry and rabbit. Dried and pickled meats are not suitable for children. Meat should never be given more than once a day to any child. At first eggs or fish are usually given on alternate days

with meat; as the child grows older eggs or fish may be given the same day as meat, but at a different meal.

Vegetables

Vegetables help to increase the bulk of the diet and furnish part of the indigestible residue or roughage necessary to regulate the bowels. As a source of minerals, vegetables fill an important role in the child's dietary. Most of the common vegetables so far examined furnish the water-soluble vitamines. The fat-soluble vitamine is less widely distributed. Green, leafy vegetables are the most valuable vegetables because they supply an appreciable amount of the fat-soluble vitamine and iron. Root vegetables are considered next in importance and tubers of the least value. Many of the vegetables contain a considerable amount of carbohydrates and some protein. The protein of the leaf vegetables, though exceedingly small in amount, is of excellent quality for promoting growth. The legumes, peas, beans and lentils are rich in iron and in protein, but should be given sparingly to young children, as they are likely to cause digestive disturbances. They should be given to children under seven years of age only after they have been put through a sieve, as in purées. White potato, although it supplies considerable mineral matter, is largely starch and should not be considered as a green vegetable, as it has about the same value as the grain products. It is an acceptable food, combines well with meat, and may be used daily for children past infancy. Potato is often difficult for infants to digest, and, as there is no difficulty in introducing other starchy foods in the diet of these early years, it is just as well not to give potato until after the first two years. Baked potato is best for young children; older children can take boiled or mashed potato equally well. Any well-cooked vegetable except corn may be used for children after infancy. Corn may be given to well children over eight years of age, if it is scored with a sharp knife after being boiled so that the digestive juices can reach the interior of the kernels. Vegetable salad, made of a mixture of cold, diced, cooked vegetables, served on a lettuce leaf with a little French dressing, is a pleasant change and an agreeable way of serving vegetables in warm weather. Children usually like such salads and digest them easily if served with a dressing largely oil, and not highly seasoned. Fresh vegetables are preferable to canned vegetables and canned vegetables are preferable to dried vegetables.

Fruits

The value of fruits lies largely in the supply of minerals, vitamines, and organic acids which they furnish. Unlike leaf vegetables, fruits do not

ordinarily contain the fat-soluble vitamine. The other vitamines, however, are found in most fruits. The best sources of the anti-scorbutic vitamines, water-soluble C, are tomato and citrus fruits, except limes. Fruits contain considerable cellulose or roughage and are helpful in preventing constipation. Very little protein is supplied by fruits. Most of them, especially dried fruits, furnish a considerable amount of sugar. For young children most fruits, except oranges, are better cooked than given raw. This is especially true of starchy fruits, such as the banana. Bananas should not be given raw, unless the skins are brown, and then only at meal time. Large amounts of fruits with seeds may be injurious for young children, as the seeds are irritating and may cause diarrhea. In the winter, canned fruits, jams and jellies are a pleasant and valuable addition to the diet of the child, but the last two should be given only at the end of a meal.

Fats

The diet of the child should contain a higher percentage of fat for fuel purposes than that of the adult, though not so high as that of the infant. The animal fats containing the fat-soluble vitamine have an added importance as foods. A child taking a pint of whole milk a day receives sufficient fat-soluble vitamine. Therefore the fat or oil given primarily for energy may be made up of the cheaper fats. Butter substitutes and vegetable oils are easily digested by children. If skim milk is given, cream or butter should be included in the diet, though the oleomargarine made from beef fat and churned with milk may have a considerable amount of the fat-soluble vitamine and may take the place of part of the butter. In general, uncooked fat is preferable to cooked fat as it is more digestible. One egg yolk has about the same amount (5 grams) of fat as two to three small slices of crisp bacon, but contains a considerable amount of fat-soluble vitamine which pork fat entirely lacks. Nuts contain a large amount of fat and when finely ground to a paste, they form a highly nutritious and digestible article of the child's dietary.

Cereals, Bread and Other Foods Made From Grain Products

Breads and cereals made from the whole grain are a more valuable food for the growing child than those made from refined products because of the mineral and vitamine loss in milling or polishing the latter. They are, however, somewhat more difficult to digest and have a laxative action.

In some ways oatmeal is the most valuable cereal because it contains an unusually large amount of iron, fat and fat-soluble vitamine. Oat products usually furnish the greatest number of calories, considering their cost, of any cereal foods. Cracked wheat and oatmeal contain both the germ

and bran, and are therefore more valuable for their vitamine and mineral content. All cereals, especially whole cereals, should be cooked slowly and for a long time. Milk in a unique way supplements the deficiencies of cereals; milk and whole grains form a nearly ideal food combination.

The package cereals which are purchased ready to serve are not on the whole so nutritious as the uncooked cereals and are much more expensive. Dry cereals should be restricted to supper dishes and for use in hot weather.

Sugar, Molasses, Syrups, Honey and Other Sweets

The value of simple sweets in the child's diet lies in the fact that like all carbohydrates they are valuable fuel foods. Used properly in the preparation of desserts, or given at the end of a meal, simple sweets do no harm and are of considerable assistance in planning a tempting and adequate diet. Sweets taken between meals always impair the appetite and digestion and tend indirectly to cause decay of the teeth. Candy should be allowed only at the end of a meal. From one to two ounces of sugar, or the equivalent in other simple sweets, may be given daily to the average well child.

PLAN OF MEALS

In supervising a child's food it is essential to see that an abundance of whole milk, vegetables and, if possible, fruits are taken daily. Cereals, bread and potato should form the bulk of the diet and can be usually given in as large quantities as the appetite of the child demands. The day's food should be fairly evenly divided between the three meals. An attempt should be made to have foods from each of the five food groups represented in every meal. In this way not only is the amount of food divided between the different meals, but there is no possibility of a single meal being made up of all energy-producing foods or all growth-producing foods. For young children the lightest meal should be supper. Older children may have luncheon at noon and dinner at night if necessary, but in such cases, care should be taken to select food for the night meal that is quickly and easily digested.

The School Lunch

The noon meal if carried to school should be carefully selected and attractively put up. A variety of foods can be prepared for the lunch basket, if the mother gives a little thought to the matter. The selection should always be made with the relative nutritive value of the different foods in mind. A hot dish especially a vegetable milk soup or cocoa, should be provided at school for children who cannot go home for the noon meal. An inadequate lunch has the same result as an insufficient breakfast.

The child tires rapidly and does not have the strength for the amount of application demanded and the total amount of food taken during twenty-four hours is almost inevitably reduced.

HEALTH HABITS AND MALNUTRITION

Sufficient adequate food is the primary essential for good nutrition. Undernourished children are usually found to take too few calories in each twenty-four hours.

Good health habits are, however, almost as important as an ample, nourishing diet, eating only at regular meal hours and taking plenty of time for meals. Hygienic care includes plenty of fresh air day and night; attention to cleanliness, which requires the washing of the hands and face before meals and at bedtime, and frequent bathing; protection of the child's body from cold and wet by proper clothing, shoes and overshoes; an adequate amount of sleep, which necessitates an early, regular bed hour; regular daily bowel movement; the brushing of the teeth at least twice a day and sufficient physical exercise and outdoor play. If the hygiene and diet of the child are properly supervised, and there is no disease or physical defect draining the child's vitality, the weight of the child should approximate the average for his height. There is always a cause for underweight.

SUGGESTIONS FOR DISCUSSION

Discuss the subject of the proper cooking of food for children, including the adequate cooking of cereals, boiling or baking instead of frying and the preparation of simple, not highly flavored, foods. Have the class suggest ways of making children like essential foods such as milk, vegetables, fruit and eggs. Discuss the management of young children in regard to eating. Explain why foods such as hot breads, coffee, sausage, pickles, nuts and green bananas are bad for children. Point out why it is important for food to be handled with clean hands. Discuss ways of gaining the cooperation of older children by interesting them in their own development. Compile a list of different kinds of sandwiches from which a choice for the lunch box may be made. Suggest variations in methods of serving milk (custards, cottage cheese, etc.), apples (baked, coddled, raw, sauce, etc.) and eggs (sandwiches, deviled, hard cooked and custards) in the school lunch. If the children choose lunches from the counter or cafeteria, discuss the proper choice.

HOME WORK

Have each member of the class plan the meals for a family for three days and show what foods may be fed to children of varying ages. Show

how the calories should be distributed in the three meals for a child. Give menus concealing a quart of milk in the daily diet. Bring in suggestions for the selection and preparation of food for the family meal which will make it suitable for the children and will at the same time be acceptable to the adults, for example, baked potatoes instead of fried potatoes.

LESSON XV

Feeding in Special Cases

IN ILLNESS

In the feeding of the family it may sometimes be necessary to consider special dietaries not only for acute illnesses, but for more or less chronic conditions such as constipation, obesity and emaciation, which can be improved by diet.

The suggestions offered in this lesson for the diets in disease are not intended to be in any sense a complete guide, but rather an aid in managing the feeding of the patient under orders of the physician, whose directions should be accurately and carefully followed. Many times, however, the physician does not give detailed directions concerning the food of the patient and the family is left to interpret the limits of liquid, soft and light diets and at such times these suggestions can safely be followed. But any case of doubt should be immediately referred to the physician in charge.

Making the Tray Attractive

Since food is often the chief break in the monotony of the day for a sick person, special thought and care should be given to its selection, preparation and service. If a tray is used, it should be large enough to allow an orderly and convenient arrangement of the dishes and silver. It should also be light, so that its weight is not a burden to the weakened patient. If a tray is not available, a light-weight board or a shallow dripping pan may be used instead. The tray should be spread with a clean cloth large enough to cover it. Paper napkins or clean paper, even light-colored wrapping paper, may be used as a tray cloth and are preferable to soiled linen. When the patient has a contagious or infectious disease, this paper can be burned and thus save the trouble of washing and disinfecting the linen. In such cases paper cups or dishes may also be used. But if china is used the most attractive dishes available should be selected and should be appropriate in size and shape for the food served in them. Dishes in which food is served should be entirely different from those in which medicine is given. Often flowers, a toy, a quotation, or a funny story on the tray will give the patient a pleasant surprise.

The Patient's Comfort

The patient should be prepared for a meal before the tray is brought into the room. His hands and face should be washed and his teeth brushed. If he is able to sit up and feed himself, a suit case, chair, or box, supplemented by pillows, can be used as a back support. In cool weather, his arms and shoulders should be covered with a wrap that does not have flowing sleeves. If a patient is not able to feed himself, great consideration must be shown in feeding him, and attention paid to the temperature of the food as well as to the rapidity with which the patient ordinarily eats.

The Food of Chief Importance

Although it is important that the patient's meal be served attractively, the food is of paramount importance. It is true that good food may be rendered less attractive by poor service, but poorly prepared food cannot be remedied by careful service. Even if the variety of foods that the patient may have is limited, interest may be gained through variety in preparation. It is unpardonable to allow a patient to become tired of a food, if it can possibly be prevented. Hot food should be served on hot dishes and should be hot when it reaches the patient. Such dishes may be covered, or placed over hot water. Cold food should be served cold, not lukewarm. Food if served in courses may be more easily kept at the right temperature and interest added to the meal.

Regulating the Amount of Food

Since muscular activity normally determines the amount of food an individual requires, a person lying quietly in bed does not need so many calories as he does when moving about. In some cases patients are inclined to over-eat. The use of bulky foods such as clear broths, watery vegetables and fruits will serve to satisfy the appetite without over-feeding the patient. These bulky foods tend as well to prevent a constipated condition which is so likely to result from lack of exercise. If the patient is on a restricted diet and has a large appetite, bulky foods should be made to look as generous as possible by serving in wide, shallow dishes. On the other hand if a generous diet is prescribed and there is little appetite, less bulky foods should be served and made to look smaller by putting them in tall, narrow dishes.

LIQUID, SOFT OR SEMI-LIQUID AND LIGHT DIETS

Liquid Diet

Liquid diet includes fruit juices in water, broths, beef extract, clear soups, gruels, milk, cocoa, eggnog, frozen milk or fruit juices and plain gelatin. It is wise to refer this list to the physician for his approval. Milk, for instance, is not really a liquid food after it reaches the stomach and sometimes it is not wise to give egg, especially raw egg.

Soft or Semi-Liquid Diet

Soft or semi-liquid diets include the foods mentioned under liquid diet, and in addition junket, ice cream and ices, blanc mange made with gelatin or Irish moss, custards, eggs (not fried or hard cooked), milk and cream toast, vegetables put through a sieve and strained cereals.

Light Diet

Light diet includes the foods mentioned in the liquid and soft diet lists and, as well, chicken, white fish, brains, oysters and most fruits and vegetables.

DIET FOR THE CONVALESCENT

In convalescence following long illnesses of fever or other debilitating diseases, the diet can do a great deal toward hastening the complete recovery. During this period the appetite often has to be coaxed and it is therefore important to pay particular attention to the preparation and service as well as to variety in the food. The individual tastes of the patient should be catered to as far as possible. The meals should be served regularly, but if the prescribed diet cannot be given in the three regular meals, mid-morning and mid-afternoon nourishment may be added. Convalescent diet, unless specially prescribed, may include any of the foods in the light diet and as well plain meats of the leaner varieties, fresh fruits and vegetables. Foods such as rich pastries should be avoided. Too great a variety of foods should not be served at one meal. If the convalescence follows a long illness, during which the patient has become emaciated, a liberal use should be made of milk, eggs, cereal products, vegetable purées and cream soups. Simple nutritious desserts may be selected from the list given in the Appendix (Lesson XV).

DIET IN CONSTIPATION

Constipation is due to a variety of causes. Faulty food habits are responsible for the greater number of cases. The prevalent American diet of meat, potato, white bread and sugar, which is decidedly lacking in bulk, contributes largely to this quite general difficulty. About 90 per cent

of the cases are due to an inactive bowel, which indicates that there is need of increased bulk in the diet, exercise, absolute regularity in attempted evacuation, massage and other mechanical stimulation of the bowels. The diet to help this condition should contain coarse, bulky foods and fat, unless for some physiological reason it is impossible for the individual to take care of the latter. The same food will affect different individuals differently and the effect should be noted.

Another type of constipation is due to spasmodic contraction of the bowel. It is less prevalent than the type caused by an inactive bowel, but it is extremely troublesome for the reason that it fails to yield to the treatment ordinarily prescribed. Although considerable bulk in the diet is desirable in coping with this form of constipation, the foods should be soft and non-irritating. Raw, rough or uncooked vegetables, oatmeal and bran should be avoided. Well-mashed soft vegetables or coarser ones which have been passed through a colander are allowed.

Certain organic troubles which cause constipation should be discussed with a physician. The habitual use of cathartics should be avoided. Many cases of chronic constipation are helped by the use of mineral oil, but this acts merely as a lubricant, is not absorbed and therefore does not cause the ill effects of the commonly used medicines. Since this oil sometimes causes digestive disturbances the effect should be carefully watched and the dosage adjusted. Before a laxative diet is started certain conditions must be considered. A person already overweight should not increase the fat in his food, nor should a person suffering from exhaustion on account of lack of food eat principally bulky foods containing little nourishment.

Laxative Diet List

Fruits—Practically all fruit, especially dates, raisins, figs, prunes, apples, pears, melons, oranges, lemons, limes and grapefruit. Exceptions are berries having large seeds such as blackberries, raspberries and grapes.

Green Vegetables—All vegetables, especially celery, cabbage, cauliflower, turnips, asparagus, carrots, parsnips, onions and spinach.

Cereals—Coarse cereals, especially those containing the whole grain, and breads made from cracked wheat, oatmeal, Graham, rye, bran or gluten. Dates and figs may be added to the breakfast cereal. Raisins and nuts may be added to the bread. Bran has been found to be effective. It may be added to muffins, bread and gems, as well as to cooked and uncooked cereals. Granulated agar, which can be purchased at a drug store, may be added to the cereal in the same way as bran, or it may be taken in fruit juice. In some cases agar is more effective than bran, but in most cases bran is just as effective and it is much less expensive.

DIET IN SEVERE COLDS

At the beginning of a cold a light, laxative diet should be given. The patient should drink large quantities of water and other liquids such as lemonade and fruit juices of various kinds.

DIET IN ACUTE INDIGESTION

The discomfort and pain covered by the general term indigestion is often the result of foolish eating. Generally the victim knows only too well what his indiscretion was. Often the missing of a single meal is all that is needed to correct the disorder. If, however, the discomfort persists, it is wise to eat no food for a day or two, or only broth, tea or a little milk, and to follow this with a simple light diet.

DIET IN TUBERCULOSIS

In tuberculosis it is of great importance to keep the body well nourished. A quart of milk a day is none too much to use in addition to a liberal supply of fresh fruits and vegetables. Part of the milk should be taken between meals so that a greater amount of more concentrated food can be eaten at meals. Specialists now are not advocating the excessive use of eggs that was formerly thought necessary, especially if a quart of milk is taken in addition to an otherwise liberal diet.

DIET FOR THE ANEMIC

Individuals often become anemic and as a result succumb to infections that might otherwise be avoided. It is questionable whether iron in the form of medicine (iron tonics) can be used directly to build red blood corpuscles. It seems rather to aid the body in making better use of the iron supplied in the food. It is important, therefore, to supply plenty of iron in the diet whether or not it is being given in addition as medicine. (See Lesson III, Table II, for the iron content of ordinary foods.) Systematic exercise, sleep and play will enhance greatly the value of the diet for the anemic.

DIET TO REDUCE WEIGHT

It is a mistaken notion that the avoidance of certain foods is sufficient to reduce weight. Instead, there should be a reduction in the total number of calories eaten. Concentrated foods, such as fats, sugar, potato and bread have so high a caloric value for their bulk that it is easy to over-eat of them. On the other hand, a diet of bulky foods such as the watery vegetables and fruits, lettuce, spinach, cabbage, turnips, oranges, grape fruit and the like has enough bulk to make it satisfying, although the total

number of calories in such a diet is low. There is less danger of overeating if food is eaten slowly and chewed thoroughly. Restricting the amount of liquid taken at meals also tends to lessen the amount of food eaten. To avoid extremes, one glass of liquid may be allowed at each meal. It should be remembered that the liquid itself is not fattening and the fat person needs just as much water as the thin person for health; therefore, if liquids are restricted at meals they must be taken freely between times. The number of calories required for the muscular activity of the individual should be calculated and the average caloric value of the food usually eaten each day determined. If the food being taken furnishes too many calories the amount should be reduced to the requirement. If this is not effective after a fair trial the food intake should be further decreased. In order to avoid disturbance of the bodily functions the reduction should not be rapid. For the consolation of the fat person it may be said that, after a given individual has grown thin, he may eat slightly more than when he is trying to reduce.

DIET TO INCREASE WEIGHT

This diet should be in many ways the reverse of the diet for reducing weight. Food that furnishes many calories for its bulk should be used freely. If only the starchy vegetables are eaten, the diet is likely to be too concentrated and not to furnish enough bulk. This may be avoided by serving each day some of the watery vegetables with cream or butter sauces. The liquid taken at meals may need to be restricted, because often the very thin person does not seem to have a normal stomach capacity. Milk, or some such food as rice served with sugar and cream, may be taken between meals.

DIET IN PREGNANCY

It is important that the pregnant woman receive an adequate diet, since she must provide building material for the developing child as well as nourishment for herself. If the diet does not provide this building material for the child, the mother's own body must supply it. The diet should include an abundance of fruit and vegetables, especially fresh ones. These are valuable for their laxative effect, and their high vitamine and mineral content. Special attention should be paid by the expectant mother to the mineral content of her food. The loss of hair and teeth which sometimes occurs as a complication of pregnancy and maternity is no doubt due in part at least to an insufficient provision of mineral salts and the fat-soluble vitamine in the diet during this period. In order to supply sufficient calcium in the diet, the expectant mother should drink about one quart of

milk a day in addition to her other food. (Diet during the nursing period is discussed in Lesson XIII.)

SUGGESTIONS FOR DISCUSSION

The class may suggest different foods to be listed under the head of liquid, soft and light diets. The special need for attractive service should be emphasized, such as the serving of hot dishes hot, and cold dishes cold, careful seasoning, setting the tray for the convenience of the patient and using the most attractive china.

Have the class make a list of foods that are concentrated; that are bulky; that are laxative; that are considered indigestible.

HOME WORK

Let each member of the class plan the meals for a week to include as many laxative foods as possible, or meals for a week that are high in iron. If any members of the class are especially interested in reducing or increasing weight, meals for such conditions, with the amounts of food used, may be planned instead.

APPENDIX

This Appendix contains additional suggestions for presenting the lessons, as some classes will be sufficiently advanced to need further information. But it will be well in many classes not to attempt to use the Appendix at all.

GENERAL SUGGESTIONS FOR PRESENTING THE LESSONS

The lessons may be presented by means of lectures, lecture-demonstrations, laboratory work by the class with discussion by the teacher, round-table discussions led by the instructor, or a combination of two or more of these methods. The method used will depend on the facilities available and on the personnel of the class. The individual group and local conditions must first be studied. Choice may be made from the suggested demonstrations and illustrative material in this Appendix or the instructor may develop other appropriate demonstrations. It must be remembered that *not all* of the demonstrations and suggestions are to be followed in the presentation of any one lesson. It is far more effective to present one idea and make that so clear and definite that the class cannot fail to get it. If too much material is presented, confusion of ideas always results.

The first two lessons do not lend themselves easily to demonstration, so none has been suggested. These two lessons should be utilized to give the class a general interest in the study of food and its selection. But if certain groups have been especially attracted to the class by the demonstration in food preparation, it will probably be expedient in such cases to add appropriate demonstration to the discussion.

The charts on the composition of food materials, referred to in the following pages, may be purchased from the United States Department of Agriculture, Office Experiment Station, Washington, D. C., at a cost of $1.00 for the complete set.

Copies of the government publications given as references at the close of each lesson, may be obtained, as specifically shown in each case, from the Secretary of Agriculture or from the Superintendent of Documents, Government Printing Office, Washington, D. C. Send to the Secretary of Agriculture for those listed as available for free distribution. Those listed for sale may be purchased direct from the Superintendent of Documents. Send money order or draft. Stamps will not be accepted. If currency is sent, it is at the owner's risk.

It should be remembered that new material is being published constantly. A complete list of Farmers' Bulletins will be sent upon request, also a monthly list of publications will be sent regularly to those who apply for it. The Superintendent of Documents also will send upon request a list of all the government publications relating to Foods and Cooking.

DETAILED SUGGESTIONS FOR DEMONSTRATIONS

LESSON I. FOOD AND ITS USE IN THE BODY

Exhibits as follows will be helpful:

Foods containing equal amounts of protein.
Foods containing equal amounts of starch.
Foods containing equal amounts of sugar.
Foods containing equal amounts of fat.

Foods from the 100-calorie portion exhibit may be put in their respective groups and the price of each portion attached.

List of Food Materials Furnishing Vitamines, Also Calcium and Iron. For a Safe Diet—Especially for Children, Include Some Foods from Each List Every Day.

Fat-Soluble A	Water-Soluble B	Water-Soluble C	Calcium	Iron
Milk fat in:	Yeast	Cabbage*	Milk†	Spinach
Whole milk	Spinach	(uncooked)	Cheese	Egg yolk
Cream	Cereals (germ	Oranges	Spinach	Navy beans
Butter	included)	Lemons	Navy beans	Lima beans
Cheese	Cabbage	Tomatoes	Figs	Potatoes
Spinach	Potatoes	Potatoes	Oranges	White fish
Fish oils, or	Carrots	Apples	Egg	Dates
fat fish	Onions	Sprouted Navy	White fish	Figs
Egg yolk	Navy beans	beans	String beans	Prunes
Liver	Soy beans	Raw carrot	Cabbage	Entire wheat
Kidney	Tomatoes	Milk, raw fresh	Carrots	Dandelion
Greens	Peas	Green salad	Onions	
Carrots	Turnip	plants	Almonds	
Sweet potatoes	Beets	Raw, fresh	Beets	
Yellow corn	Liver	fruit	Dates	
Lettuce	Kidney		Peanuts	
Cabbage	Heart		Lima beans	
	Brain		Entire wheat	
	Milk		Potatoes	
	Greens		Prunes	
			English walnuts	

*Long cooking weakens or destroys water-soluble C.
†Without milk in the diet, it is difficult to obtain a sufficient amount of calcium.

LESSON II. PLANNING THE DAY'S FOOD

Procure blanks showing the group distribution of foods on which the day's foods may be written in the spaces in which they belong. These records should be kept for a week, or better for a month. Some foods which

contain more than one foodstuff would have to be placed in more than one group; for example, "tamale pie" in the meat, cereal and vegetable groups. A blank such as the following in which a suggestive day's dietary is recorded, or the Food Record blank prepared by the American Red Cross, may be used.

Meals	Group I Fruits and vegetables	Group II Meats, eggs, cheese, milk, dried legumes	Group III Cereals, bread, and cereal products	Group IV Sugar and sweets	Group V Fats and fat foods
Breakfast.....	Orange	Cocoa	Toast, Oatmeal	Sugar in cereal and cocoa	Butter Cream
Luncheon..... (or dinner)	Scalloped cabbage Plums	Cheese in cabbage	Bread, Cookies	Sugar cookies	Cheese in cabbage Butter
Dinner.....	Lettuce salad Mashed potatoes Tomatoes	Beef roast Milk in gravy Egg in tapi Egg in salad dressing	Rolls Tapioca Potatoes	Honey Sugar in tapioca	Oil salad dressing Fatingravy

LESSON III. VEGETABLES AND FRUITS

Charts on the composition of food material:

Roots and succulent vegetables.

Legumes and corn.

Fresh and dried fruits.

Fruit and fruit products.

Composition of some fruits and fruit products (extra chart with fuller explanation, which can be obtained from United States Department of Agriculture).

Demonstrations

To illustrate different methods of preparing vegetables and fruits:

Vegetable Soup

1. Cream of bean or lentil soup
   (Use of dry vegetables.)
2. Creole soup
   (Use of left-over vegetables.)

Baked Vegetable

Baked potato, squash or onions.

TABLE XIII.

Amounts of Important Mineral Matter in One Serving of Some Common Foods (Compiled from Various Sources).

Food	Weight of one serving in grams	Amount in grams found in one serving		
		Calcium	Phosphorus	Iron
Protein foods				
Beef-round	115 (raw) E. P*	.0142	.2640	.0037
Fish—white fish	172 A. P.†			
	125 E. P. (raw)	.0312	.3283	.0016
Egg	50 (without shell)	.0335	.0900	.0015
Egg yolk	17	.0023	.0890	.0015
Milk	185	.2220	.1721	.0004
Cheese	20	.1862	.1366	.0003
Carbohydrate foods				
Bread—white	40	.0108	.0372	.0004
Bread—whole wheat	40	.0200	.0700	.0006
Bread—Graham	40	.0200	.0872	.0010
Jelly	20	.0028	.0016	.0001
Rice	28 (dry)			
	120 (cooked)	.0025	.0269	.0003
Rolled oats	15 (raw)	.0104	.0588	.0006
Shredded wheat	28	.0115	.0907	.0013
Vegetables				
Beans—Navy	45 (dry)	.0720	.2120	.0032
Lima	30 (dried)	.0213	.1014	.0021
String	70 (cooked)	.0322	.0364	.0008
Beets—canned	100 (cooked)	.0290	.0390	.0006
Cabbage	80 (raw)	.0360	.0232	.0009
Carrots	70 (raw)	.0392	.0322	.0004
Lettuce	30	.0129	.0126	.0002
Onions	190 (raw)	.0306	.0405	.0005
Potatoes	140 (raw)	.0196	.0812	.0018
Spinach	115 (cooked)	.0771	.0782	.0041
Fruits				
Apples	140 E. P.	.0098	.0168	.0004
Bananas	65 E. P.	.0059	.0202	.0004
Dates	45 E. P.	.0293	.0252	.0014
Figs	35	.0567	.0406	.0011
Oranges	125 E. P.	.0563	.0263	.0003
Prunes	35 E. P.	.0189	.0368	.0011
Raisins	20 E. P.	.0128	.0264	.0004
Nuts				
Almonds	15 (shelled)	.0359	.0698	.0006
Peanuts	40 (in shell)			
	30 (shelled)	.0213	.1197	.0006
Walnuts—English	50 (in shell)			
	20 (shelled)	.0178	.0716	.0004

*E. P.—Edible portion.
†A. P.—As purchased.

Daily calcium requirement 0.67 grams.
Daily phosphorus requirement 1.44 grams.
Daily iron requirement 0.015 grams.

LESSON III. VEGETABLES AND FRUITS—Cont'd.

Stewed Vegetables

Carrots, tomatoes or green peas.

Boiled Vegetables

Beets, turnips or cabbage.

Creamed or Scalloped Vegetables

Cabbage, potatoes or cauliflower with cheese.

Vegetable Salad

1. Lettuce, cabbage or tomato.
2. Asparagus, string beans, peas, beets or any other combination of cold cooked vegetables.

Dried Fruits

1. Apricots, peaches or prunes.
2. Dates, raisins or figs in combination with cereals.

Fruit Salads.

LESSON IV. PROTEIN

Charts on composition of food materials:

Milk and milk products.
Meats—fresh and cured.
Fish, fish products and oysters.
Eggs and cheese.
Legumes.
Cereals.

Demonstrations

To illustrate the cooking of protein foods, avoiding high temperatures:

1. Cheese in cheese sauce or fondue.
2. Soft or baked custards.
3. Creamed eggs.
4. Cottage cheese.

LESSON V. MILK THE INDISPENSABLE FOOD

Charts on composition of food materials:

Milk and milk products.

Demonstrations

To illustrate uses of milk in cooking:

1. Cream of tomato soup.
2. Cocoa.
3. Oatmeal cooked in milk.
4. Creamed vegetables or meat.

5. Blanc mange or rice pudding.

Proportion of ingredients used to one cup of milk in common dishes made with milk:

Dish	*Amount of ingredients used to one cup milk*
Junket	¼ tablet
Blanc mange	1½ T.* cornstarch
Baked or soft custard	1 egg
Custard to turn out	1½–2 eggs
Cheap custard	½ egg and ½ t.† cornstarch
Eggnog	1 well-beaten egg
Tapioca cream	1 (slightly rounded) T. minute tapioca and ½ egg
Thin white sauce	1 T. flour, 1 T. fat (soups)
Medium white sauce	2 T. flour, 2 T. fat (creamed dishes)
Thick white sauce	3–5 T. flour, 3 T. fat (binding agent in croquettes, souffle, etc.)

Level measurements are used except where otherwise indicated

LESSON VI. MEAT AND MEAT SUBSTITUTES

Charts on composition of food materials:

Meat, fresh and cured.
Fish, fish products and oysters.
Eggs and cheese.
Legumes and corn.
Nuts and similar foods.

Demonstrations

To illustrate the three main methods of cooking meat:

1. Boiling, to extract the juices
   Soup stock. Variations of meat soups.
2. Broiling or roasting, to retain the juices in the meat
   a. Broiled steak.
   b. Prime rib roast.
3. Stewing, braising or pot roasting. Long, slow processes of cooking to soften connective tissue of tough meats. Juices or gravy served with the meat.

Methods for extending the flavor of meat:

1. Scalloped meat and macaroni.
2. Meat and vegetable stew.
3. Scrapple.

*T=tablespoon, †t=teaspoon

Meat substitutes:

1. Bean or peanut loaf.
2. Fish. Use local fish and serve with sauces such as tomato, Hollandaise or Tartar.

Beef cuts and their uses in cooking:

Tough cuts. To be prepared by boiling, stewing, braising, or pot roasting

Neck.	Round.
Brisket.	Hind shank.
Chuck.	Tail.
Fore shank.	Kidney.
Plate.	Heart.
Flank.	Liver.
Rump.	Tongue.

Tender cuts. To be prepared by broiling or roasting:

Sirloin steak or roast.
Porterhouse steak or roast.
Club steaks.
Prime ribs (eleventh and twelfth ribs).

LESSON VII. CEREALS THE BEST RETURN FOR THE MONEY

Charts on composition of food materials:

Cereal grains.
Bread and other cereal foods.

Demonstrations

To illustrate the use of cereals as:

1. Breakfast foods, cooked with dried fruits.
2. Barley soup.
3. Tamale pie (meat extender).
4. Rice croquettes. Suggestions for use of deep fat frying.
5. Bread or muffins.
6. Indian pudding with crumbs (also illustrating use of left-overs).

LESSON VIII. BREAD

Charts on composition of food materials:

Bread and other cereal foods.

Demonstrations

1. Yeast bread

   The different steps in bread making may be shown by starting bread at such times preceding the lesson that all of the important steps may be demonstrated. Emphasize the factors of temperature, manipulation, utensils and proportion of ingredients used.

   Modifications of sponge for rolls, tea ring, Graham or nut bread may be suggested.

2. Doughs and batters

   The making of quick breads such as biscuits, muffins or pop-overs may be demonstrated.

3. Bread judging.

NOTE.—Procure several samples of homemade and baker's bread and judge by the following score card.

*Revised Score Card by Miss Bevier**

General appearance	20%
Size (5)	
Shape (5)	
Crust (10)	
Color	
Character	
Depth	
Flavor	35%
Odor	
Taste	
Lightness	15%
Crumb	30%
Character (20)	
Coarse—fine	
Tough—tender	
Moist—dry	
Elastic or not	
Color (5)	
Grain—distribution of gas (5)	
Total	100%

LESSON IX. SUGAR AND SWEETS

Charts on composition of food materials:

Sugar and similar foods.

*University of Illinois Bulletin, Vol. 10, No. 25 (March, 1913).

Demonstrations

To show the uses of sugar and sweets:

1. Dried fruits used as confection—stuffed dates, etc.
2. Dried fruits as sweetening agents—tapioca pudding, breakfast cereals, etc.
3. Cooked frosting.
4. Jelly, marmalade, conserve.
5. The use of the thermometer in cooking syrups

   The following temperatures apply to syrups made from cane sugar. The addition of glucose to cane sugar lowers the temperature of the syrups at the various stages:

   a. Thread, 230° Fahrenheit, used for frosting.
   b. Soft ball, 236° Fahrenheit, used for fudge, panocha, and fondant.
   c. Hard ball, 252° Fahrenheit, used for chocolate caramels, plantation drops and butter cups.
   d. Crack, 270° Fahrenheit, used for butter scotch, molasses candy and popcorn balls.
   e. Hard crack, 293° Fahrenheit, used for glacé fruits and nuts.
   f. Caramel, 310° Fahrenheit, used for peanut brittle.

LESSON X. FATS

Charts on composition of food materials:

Butter and other fat-yielding foods.

Nuts and nut products.

Demonstrations

1. Mayonnaise salad dressing. Suggest use of different vegetable oils.
2. Deep fat frying of uncooked and cooked foods:

   Temperature of fat for uncooked foods, 347°–374° F.

   Temperature of fat for cooked foods, 365°–401° F.

   Temperature of fat for cold cut uncooked foods, 374°–383° F.
3. Pie crust.
4. Biscuits with variations for short cake, dumplings, etc.
5. Render the fat from trimmings of either cooked or uncooked meat.

   Measure the clear fat and estimate the saving effected.
6. Illustrate method of clarifying fats.

LESSON XI. BEVERAGES AND FOOD ACCESSORIES

Demonstrations

1. Cold drinks.
2. Hot drinks.
3. Beverages for the sick.
4. Coffee making—boiled, drip and percolated.
5. Tea making—teaball, steeped and boiled.

Plan to have all ready at the same time in order to compare flavor. Show the relative amounts of tannin extracted by these three methods by adding ½ teaspoon of lead acetate solution to ¼ cup of the tea to be tested. Note the amount of precipitation.

LESSON XII. CALCULATION OF THE DIETARY

After discussing the factors which influence the selection of an adequate diet for a particular family, plan a day's dietary for this family. If there is opportunity, one of these meals can be prepared and served as illustrative of the proper service of meals.

LESSON XIII. INFANT FEEDING

Demonstrations

1. Scalding of milk.
2. Preparation of one day's feeding of modified milk.
3. Preparation of vegetables for babies—thorough cooking and putting through sieve.
4. Care of bottles, nipples and utensils.

NOTE.—The following list of equipment is needed in the preparation of bottle feedings for the infant:

(*a*) Nursing bottles (6 or 8) holding eight ounces.
There should be at least one more bottle than the number of feedings in 24 hours.

(*b*) Nipples (6 or 8), one for every bottle.

(*c*) Rubber corks, non-absorbent cotton, or squares of clean wax paper (4 inches square) and rubber bands.

(*d*) Bottle brush.

(*e*) Bottle rack or container. May be home-made out of any small pail with wires fitted to separate the bottles.

(*f*) Glass graduate (photographer's measuring glass), holding at least 8 ounces and graduated in one-half ounces.

(*g*) Measuring spoons (table, tea and half tea sizes).

(*h*) Mixing spoons (table and tea sizes).
(*i*) Two quart pitchers for mixing food.
(*j*) Double boiler holding one quart.
(*k*) Saucepan to boil water or scald milk.
(*l*) Small glass or enamel ware funnel, if small-mouthed bottles are used.
(*m*) Aluminum cream dipper, holding one ounce.
(*n*) Flat-bottomed, enamel-ware soup kettle, fitted with false bottom and holding 2 or 3 gallons (for sterilizing utensils).
(*o*) Deep cup for warming bottles.

LESSON XIV. FOOD FOR THE CHILD FROM 2-16 YEARS

Demonstrations

School lunch. Choice of food, preparation and packing.

LESSON XV. FEEDING IN SPECIAL CASES

Demonstrations

1. Preparation of liquid, soft and light diets.
2. Setting and serving of trays for the sick.

Suggested Use of *Milk* and *Eggs* in Simple Desserts and Sauces.

- Rice: custard, cream, baked, steamed, fruit
- Tapioca: custard, cream, fruit, baked
- Custard: baked, soft, caramel
- Cornstarch: soft, baked, chocolate
- Farinaceous: cornmeal, Indian, steamed, fruit
- Gelatin: fruit, fruit cream, Bavarian, sponge, cornstarch
- Fruit Whip: prune, apricot, apple, peach, pineapple
- Sauces: cream, caramel, maple, chocolate, custard, lemon, golden
- Milk Dishes: toast, cream soups, custard, cereals, cooked in milk, white sauces, puddings, cottage cheese
- Egg Dishes: creamed, souffle, baked, omelette, scrambled, soft cooked, coddled

GENERAL RULES FOR CHOOSING OVEN TEMPERATURES*

It must be remembered that there is no one method of managing ovens which can be expected to prove invariably superior to all others. There are always at least two ways of baking any given product. For instance, popovers are usually put into a hot oven (about 450° F.), which is then reduced in temperature about 50°; yet equally delicious popovers can be made by putting them into a cold oven and bringing the heat up gradually through a somewhat longer time. Similarly, bread dough may be allowed to rise until it has somewhat more than doubled its original bulk, and put into a hot oven (400° or a little more), then the heat reduced to finish baking; or it may be put into a moderate oven (350° to 375°) before it is quite so well risen, and allowed to complete the rising process in the oven while the oven is being heated up to 400° or a little higher, after which the temperature is reduced to complete the baking process. Results are equally good in either case, if the procedure has been properly followed.

Again, ovens of varying sizes and construction do not always bake in the same way, even though the thermometer may record the same temperature in every case. A joint will roast, or a cake or loaf of bread bake quite as well in a large, heavy oven (coal range, heavy "fireless" gas range) at a temperature 50° lower than in a smaller, thinner walled gas-range oven through which a blast of hot air is rapidly circulating.

Choose temperatures with the following principles in mind:

1. The larger sizes of loaf, roll, muffin, potato, etc., usually require lower temperatures for longer periods, and the smaller sizes higher temperatures and shorter periods—other things being equal.

2. The shape of the loaf, roll, etc., is important. A half-pound sponge cake or angel-food cake baked in a Turk's-head pan (center tube) stands a comparatively high temperature better than does the same weight of cake baked as an ordinary loaf.

3. The composition of the batter or dough largely governs the baking temperature. A plain loaf cake containing comparatively little sugar, egg and fat (i. e., a "cheap" cake) requires greater care and a more gradually applied heat than does a richer cake; it should therefore be put into a cool oven in order to get the best results.

4. The small portable gas oven requires somewhat higher temperatures to secure the results obtainable in a larger oven, particularly if the latter is a large, heavy oven with little ventilation.

*Through the courtesy of Dr. Minna C. Denton, States Relation Service, U. S. Department of Agriculture, Washington, D. C.

TABLE XIV. *Oven Temperatures.*

Product to be baked	Range of temperature over which it may be baked
Biscuits, baking powder	400 F. to 500 F.
Bread	350 F. to 450 F. Begin low and raise temperature rapidly reducing again or begin high and reduce sharply
Cake	
Angel food	300 F. to 400 F. Or, put into 410 F. oven, turn gas out for 5 to 10 minutes, lower to 330 F., then at last raise to 370 F.
Cookies	375 F. to 400 F.
Cup cakes	300 F. to 400 F.
Gingerbread	370 F. to 400 F.
Layer cake	300 F. to 400 F. Begin low, raise gradually.
Loaf cake	280 F. to 375 F. Begin low, raise temperature very gradually at first, then more rapidly.
Sponge cake	300 F. to 400 F. (See Angel Food)
Custard	250 F. to 350 F. Or set in pan of hot water, and use 350 F. to 450 F.
Meat, roasted	400 F. to 500 F., then 350 F. to 250 F. Sear at higher temperatures (or else in heavy kettle or skillet on top of range) reduce sharply and finish at lower temperatures.
Muffins	425 F. to 450 F.
Pastry (no filling)	450 F. to 550 F.
Pies (with filling)	450 F. to 400 F. Put into hot oven, lower when it begins to color.
Popovers	450 F. to 350 F.
Potatoes	400 F. to 500 F. Or at lower temperatures, increasing the time.
Puddings	350 F. to 400 F. If high in eggs or milk, bake like custard.
Rolls	400 F. to 450 F.
Souffle	350 F. to 400 F. (See Custard).

SUPPLEMENTARY BIBLIOGRAPHY

Chemistry of Food and Nutrition—SHERMAN, H. C.

Second Edition, Macmillan, 1918

The instructor will find this work exceedingly valuable as a source book. The principles of normal nutrition are clearly and carefully presented.

Food Products—SHERMAN, H. C.

Macmillan, 1917

The scope of this book may best be stated by quoting from the preface: "The general plan is to devote a chapter to each important type of food, covering (1) an account of its production and preparation for market with such brief statistical data as will indicate the relative economic importance of the industry, (2) the proximate composition and general food value, (3) questions of sanitation, inspection, and standards of purity, (4) special characteristics of composition, digestibility, nutritive value and place in the diet." The instructor will find this book valuable as a source book and also as a reference book for the use of her class.

Nutrition and Clinical Dietetics—CARTER, H. S., HOWE, P. E., AND MASON, H. H.

Lea & Febriger, 1917

About half the space in this work is devoted to the discussion of foods and normal dietetics, which the instructor can probably turn to with profit. The second part of the book deals with feeding in disease. Much of this latter part will be found to be quite beyond the limits of the foregoing lessons.

Feeding the Family—ROSE, M. S.

Macmillan, 1917

This is a comprehensive and satisfactory manual of dietetics for general class use.

Every-day Foods in War Time—ROSE, M. S.

Macmillan, 1918

The usefulness of this little book has not ended with the war. Written in popular style.

The American Home Diet—MCCOLLUM, E. V., AND SIMMONDS, NINA

Frederick C. Mathews Company, 1920

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Food in War Time—LUSK, G.
W. B. Saunders Company, 1918
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What to Feed Children—MENDENHALL, D. R., AND DANIELS, A.
University of Wisconsin, Circular 69
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Food and the War—THE U. S. FOOD ADMINISTRATION
Houghton Mifflin Co., 1918
Considerable of the history of the food situation during the war is to be found in this volume together with a discussion of foods and food conservation. Part II consists of a laboratory manual of food selection, preparation and conservation.

Food Primer for the Home—GILLETT
Bureau of Food Supply, A. I. C. P., 105 East 22d St., New York City
A usable catechism on food and nutrition.